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THE

FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. IV.

ASCLEPIADEÆ TO AMARANTACEÆ.

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FLORA OF BRITISH INDIA.

ORDER XCV. **ASCLEPIADEÆ.** (By J. D. Hooker.)

Herbs or shrubs, usually twining. *Leaves* opposite or obsolete, very rarely alternate, quite entire, exstipulate. *Inflorescence* various, usually an axillary umbelliform cyme; flowers regular, hermaphrodite, 5-merous. *Calyx* inferior, lobes or segments imbricate. *Corolla lobes* or *segments* valvate or overlapping to the right, very rarely to the left; tube or throat often with a ring of hairs, scales, or processes (the outer or *corolline corona*). *Stamens* at the base of the corolla, filaments free in *Periploceæ* with or without interposed glands; in other tribes, connate into a generally very short fleshy column, which usually bears a simple or compound ring or series of scales or processes (inner or *staminal corona*) that are attached to the filaments or to the back of the anthers, or to both; anthers crowning the column, connate or free, adnate by the connective to the stigma, 2-celled; tip often produced into an inflexed membrane; pollen forming one or two granular or waxy masses in each cell, the masses united in pairs or fours to a gland (*corpuscle*) which lies on the stigma. *Ovary* of two distinct superior carpels, enclosed within the staminal column; styles 2, short, uniting in the stigma, which is 5-angled short and included between the anthers, or is produced beyond them into a long or short simple or 2-fid column; ovules many, rarely few, 2-seriate in each carpel. *Fruit* of 2 follicles. *Seeds* compressed, usually flat ovoid winged and surmounted with a dense long brush of hairs (*coma*) (absent in *Sarcolobus*); albumen copious, dense; embryo large; cotyledons flat, radicle short, inferior.—DISTRIB. Species about 1,000, chiefly tropical.

The analysis of the plants of this order is most difficult, and in dried specimens never satisfactory, from the fleshiness and complexity of the coronal processes and anthers. I have spent many months over the Indian ones, and have kept pretty close to the generic limits adopted in the "Genera Plantarum." I have, however, been obliged to abandon the tribe *Stapelieæ*, to suppress *Vincetoxicum*, and to propose several new genera.

SUBORDER I. **Periploceæ.** Filaments usually free; anthers acuminate or with a terminal appendage; pollen-masses granular, in pairs in each cell.

TRIBE I. **Periploceæ.** Characters of the Suborder.

* Coronal scales or processes 0.

Anthers with bearded appendages . . . . 1. PENTANURA.

** Coronal scales corolline, free, short, thick.

Corolla very small, rotate, lobes valvate . . . . 2. HEMIDESMUS.

Corolla small, rotate, lobes overlapping . . . . 3. CRYPTOLEPIS.
Corolla large, funnel-shaped, lobes overlapping . . . . . *3. CRYPTOSTEGIA.

*** Coronal scales 5, free, close to or adnate to the filaments.

† *Coronal scales short, broad; filaments without interposed glands.*

A pubescent twining shrub; leaves opposite . . . . 4. BRACHYLEPIS.
An erect tree; leaves alternate . . . . 5. UTLERIA.

†† *Coronal scales filiform or subulate.*

a. *Filaments free without interposed glands.*

Cymes stout, pubescent. Corolla-lobes short, broad . . . 6. FINLAYSONIA.
Cymes slender, glabrous. Corolla-lobes slender, straight . 7. ATHEROSTEMON.

β. *Filaments free, with interposed teeth or glands.*

Cymes slender, glabrous. Corolla-lobes short, triangular . 8. ATHEROLEPIS.
Cymes slender, glabrous. Corolla-lobes long, slender. . . 9. ATHERANDRA.
Cymes short, sessile. Corolla-lobes short, ovate . . . . 10. STREPTOCAULON.
Cymes loosely panicled. Corolla-lobes lanceolate . . . . 11. MYRIOPTERON.

††† *Coronal scales short, broad; filaments connate, with interposed glands.*

Cymes peduncled. Corolla-lobes ovate, valvate . . . . 12. DECALEPIS.

**** Coronal scales connate into a lobed ring; filaments without interposed glands.

Corolla rotate, lobes overlapping . . . . 13. PERIPLOCA.

SUBORDER II. **Euasclepiadeæ.** Filaments connate; pollen-masses waxy.

TRIBE II. **Secamoneæ.** Anthers with a membranous inflexed tip; pollen-masses in pairs in each cell (20 in all), sessile in fours (2 pairs) on the corpuscle.

Corolla rotate, lobes overlapping to the right . . . . . 14. SECAMONE.
Corolla rotate, lobes overlapping to the left . . . . . . 15. TOXOCARPUS.
Corolla rotate, lobes valvate . . . . 16. GENIANTHUS.

TRIBE III. **Cynancheæ.** Anthers with a membranous inflexed tip; pollen-masses solitary in each cell (10 in all), sessile or pedicelled in pairs on the corpuscle, pendulous.

* Corona single, corolline, 5-cleft . . . . 17. GLOSSONEMA.

** Corona double, corolline and staminal . . . . 18. OXYSTELMA.

*** Corona staminal, of 5 processes adnate to the anthers; or 0.

† *Stem erect.*

Corolla valvate. Coronal processes laterally compressed . 19. CALOTROPIS.
Corolla valvate. Coronal processes spathulate . . . . .*19. ASCLEPIAS.
Corolla-lobes overlapping. Coronal processes short, fleshy . 20. PENTABOTHRA.

†† *Stem twining. Corolla-lobes overlapping.*

Corolla campanulate. Coronal processes ligulate . . . . 21. RAPHISTEMMA.
Corolla rotate. Coronal processes laterally compressed . . 22. PENTATROPIS.
Corolla funnel-shaped. Coronal processes laterally compressed 23. DÆMIA.
Corolla campanulate. Coronal processes 0 . . . . . . 24. ADELOSTEMMA.

**** Corona single, staminal, cupular or annular. Corolla rotate.

Corona of a 10-lobed ring, and 5 horny processes behind the anthers . . . . 25. HOLOSTEMMA.
Corona annular. Leafy erect or twining herbs or shrubs . 26. CYNANCHUM.
Corona annular. Leafless straggling shrubs . . . . 27. SARCOSTEMMA.

TRIBE IV. **Marsdenieæ.** Anthers with a membranous inflexed tip (absent in *Physostelma* and rarely in *Hoya*); pollen-masses solitary in each cell (10 in all), sessile, or pedicelled in pairs on the corpuscle, erect (rarely horizontal or pendulous in *Tylophora*).

* Corolla-lobes overlapping. Corona 0, or corolline.

Stem twining. Corolla-lobes short. Corona 0 . . . . . . 28. SARCOLOBUS.
Stem pendulous. Corolla-lobes long. Stigma included . . 29. PENTASACME.
Stem twining. Corolla lobes short. Corona on the corolla-tube . . . . 30. GYMNEMA.

** Corolla-lobes overlapping. Coronal processes on the staminal column, rarely 0.

† *Corolla urceolate companulate or salver-shaped.*

Corolla urceolate. Coronal processes minute or 0. Stigma included . . . . 31. GONGRONEMA.
Corolla urceolate or salver-shaped. Coronal scales on the back of the anthers, simple . . . . 32. MARSDENIA.
Corolla rotate or salver-shaped. Coronal scales on the back of the anthers, notched . . . . 33. PERGULARIA.
Corolla salver-shaped, coriaceous. Coronal scales 0 (in Indian species) . . . . 34. STEPHANOTIS.
Corolla-lobes long, doubled down inwards in bud . . . . 35. LYGISMA.

†† *Corolla rotate.*

Cymes various. Column minute. Coronal processes fleshy . 36. TYLOPHORA.
Cymes umbelliform. Column large; coronal processes simple 37. TREUTLERA.
Cymes racemiform. Column minute, fleshy; coronal processes 2-fid . . . . 38. COSMOSTIGMA.
Cymes umbelliform, pendulous. Coronal scales spreading, cuspidate . . . . 39. DREGEA.

*** Corolla valvate. Coronal processes adnate to the staminal column.

Corolla small, rotate. Column short, corona stellate. Follicles slender . . . . 40. HETEROSTEMMA.
Corolla large, rotate. Column short, corona stellate. Follicles stout . . . . 41. DITTOCERAS.
Corolla urceolate or disciform. Corona cupular, fleshy . . 42. OIANTHUS.
Corolla minute, urceolate. Coronal scales membranous, erect 43. DISCHIDIA.
Corolla rotate. Corona very large, stellate . . . . . . 44. HOYA.
Corolla cupular. Corona large, stellate . . . . 45. PHYSOSTELMA.
Corolla-tube short, lobes long subulate. Ovary sunk in the calyx-tube . . . . 46. PYCNORHACHIS.

TRIBE V. **Ceropegieæ.** Anthers incumbent on the stigma, without a membranous tip; pollen-masses one in each cell (10 in all) sessile in pairs on the corpuscle, erect or horizontal. Corolla-lobes valvate in all.

* Corona double; corolline lining the corolla-tube and forming minute processes in the sinus of its lobes, staminal annular.

Calyx turbinate, 5-lobed. Corolla rotate . . . . 47. LEPTADENIA.
Calyx 5-partite. Corolla salver-shaped . . . . 48. ORTHANTHERA.

** Corona staminal, simple or compound, annular, 5–10 lobed, with 5 processes from its inner face which overlap the anthers.

† *Leafy herbs with terete stems and branches.*

Corolla rotate, lobes very narrow. Stem very slender, erect or twining . . . . 49. BRACHYSTELMA.
Corolla-tube long. Stem stout or slender, erect or twining . 50. CEROPEGIA.
Corolla rotate. Stem erect and branches short, stout, fleshy . 51. FREREA.

†† *Leafless herbs, with fleshy 4-angled stems and branches.*

Corolla rotate, lobes very narrow. Flowers lateral, subsolitary 52. CARALLUMA.
Corolla rotate, lobes very broad. Flowers terminal, umbelled 53. BOUCEROSIA.

GENUS KNOWN BY NAME ONLY.

ODONTANTHERA, *Wight in Lindl. Veg. Kingd.*, 626.

TRIBE 1. PERIPLOCEÆ.

1. PENTANURA, *Blume.*

Twining glabrous shrubs. *Leaves* opposite, elliptic, strongly nerved. *Flowers* small, fascicled on a short axillary peduncle, purplish. *Calyx* small, 5-glandular within. *Corolla* subcampanulate, fleshy; lobes concave, overlapping to the right. *Coronal scales* 0. *Filaments* free, arched, bases distant; anthers oblong, adherent below to the stigma, tipped with bearded appendages; pollen-masses granular; appendages of the corpuscles stipitate, flabellate. *Stigma* capitate, 5-angled. *Follicles* divaricate, cylindric. *Seeds* comose.—Species 2; a Sumatran and the following.

P. khasiana, *Kurz in Herb. Calcutt.*; glabrous, leaves elliptic-lanceolate acuminate at both ends, petiole slender. Pentanura sp., *in regione Yunan* and Periploca khasiana, *Benth. in Gen. Pl.* ii. 740 and 746.

KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T., Kurz.*—DISTRIB. Yunan.

Branches smooth. *Leaves* 4–5 by 1¼–1½ in., reddish when dry beneath and finely reticulated, midrib stout; nerves 8–10 pairs, arched; petiole ½–⅝ in. *Peduncle* stout, ¼ in. in the Khasian specimen, ¼–1 in. in the Yunan ones. *Corolla* about ¼ in. diam.; lobes pubescent within, pink. *Filaments* and back of anther pubescent as in *Phyllanthera* (which is perhaps not generically distinct) in the Yunan specimens, glabrous in the Khasian. *Style* elongate; stigma 2-lobed at the top. *Follicles* (young) in Khasian specimen ½–⅔ in. long, ovoid, incurved, obtuse.—I have not seen the Sumatran species which is the type of the genus.

2. HEMIDESMUS, *Br.*

Twining shrubs. *Leaves* opposite, hoary or pubescent beneath. *Flowers* small, in opposite crowded subsessile cymes, greenish-purple. *Sepals* glandular within, acuminate. *Corolla* rotate; lobes thick, valvate. *Coronal scales* 5, on the corolla-throat, alternate with its lobes, short, thick. *Filaments* distinct; anther-tips connate, inflexed, membranous; pollen-masses cohering in pairs in

each cell, granular; appendages of the corpuscles dilated or hooded. *Stigma* 5-angled, crown flat. *Follicles* long, slender, divaricate, terete, smooth. *Seeds* comose.

H. indicus, *Br. in Mem. Wern. Soc.* i. 57; leaves from broadly obovate to oblong elliptic linear or linear-lanceolate obtuse or apiculate. *Wall. Cat.* 8243; *Wight Contrib.* 63; *Wight Ic.* t. 594; *Deless. Ic. Sel.* v. t. 55; *Dalz. & Gibs. Bomb. Fl.* 147; *Grah. Cat. Bomb. Pl.* 122; *Dcne. in DC. Prodr.* viii. 494; *Benth. & Trim. Med. Pl.* t. 174. H. Wallichii, *Miquel Pl. Hohenack.* No. 359. Periploca indica, *Willd. Sp. Pl.* i. 2251. Asclepias pseudo-sarsa, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 39, *excl. syn.*—*Burm. Thes. Zeyl.* t. 83, f. 1; *Rheede Hort. Mal.* x. t. 34.

NORTHERN INDIA; from Banda to Oudh and Sikkim, and southwards to Travancore and CEYLON.

Leaves most variable in form, length, and breadth, the shorter and broader 1–1½ by 1–1½ in., the longer 4 by ⅛ in., the broadest sometimes retuse at the tip, the narrowest finely acuminate, those on the young shoots often white along the midrib; petiole ⅙ in. *Pedicels* clothed with ovate acute imbricating bracts. *Corolla* ⅙ in. diam., green without, purple within. *Follicles* 4–5 in. *Seeds* ⅕ in., ovate-oblong, flattened, black; coma 1 in.

VAR. *pubescens*; stem and leaves beneath and sometimes above pubescent. H. pubescens, *Wight & Arn. Contrib.* 63; *Wight Ic.* t. 1320; *Wall. Cat.* 8244; *Dcne. in DC. Prodr.* viii. 495.—Behar on the Soane river, *J. D. H.*; Deccan Peninsula, *Wight*, &c.

3. CRYPTOLEPIS, *Br.*

Twining glabrous shrubs. *Leaves* opposite. *Flowers* in very lax slender dichotomous few-flowered peduncled terminal or axillary cymes. *Calyx* with 5 scales within. *Corolla-tube* short, cylindric or bell-shaped; lobes linear, overlapping and twisted to the right. *Coronal scales* 5, about or above the middle of the tube, linear or clavate, conniving. *Filaments* subconnate by their broad bases; anthers short, adhering by their base to the stigma, tips conniving, acuminate; pollen-masses cohering in pairs in each cell, granular, appendages oblong. *Stigma* broadly conic. *Follicles* divaricate, terete, smooth. *Seeds* comose.—DISTRIB. Species 14; Tropical Asiatic and African.

1. **C. Buchanani,** *Roem. & Sch. Syst.* iv. 409; glabrous, leaves oblong or elliptic, glaucous beneath, nerves very many slender nearly horizontal, cymes axillary many-flowered. *Wight Ic.* t. 494, and *Ill.* t. 182, f. 8; *Falc. in Trans. Linn. Soc.* xix. 53, t. 5; *Brandis. For. Fl.* 330; *Dalz. & Gibs. Bomb. Fl.* 148. C. reticulata, *Wall. Cat.* 1640; *Royle Ill.* 270. Nerium reticulatum, *Roxb. Hort. Beng.* 19, and *Fl. Ind.* ii. 8. Echites reticulata, *Roth Nov. Sp.* 134. E. cuspidata, *Heyne in Herb. Rottl.*—*Rheede Hort. Mal.* ix. t. 11.

Throughout INDIA, from WESTERN KASHMIR to ASSAM and BIRMA, ascending the Himalaya to 4000 ft.; and southwards to TRAVANCORE and CEYLON.

Leaves 3–6 by 1–2½ in., coriaceous, shining above, sometimes obovate, apiculate or acuminate, base acute; petiole ½ in. *Cymes* very shortly peduncled, paniculate; branches short, divaricate. *Sepals* short, acute. *Corolla* yellow, ⅜ in. diam.; tube very short, lobes lanceolate. *Coronal scales* clavate. *Follicles* 2–4 in., straight, rigid, gradually narrowed from about the middle where they are ½–¾ in. diam. *Seeds* ¼ in. long, oblong-ovate, contracted below the tip, compressed; coma 1 in.

2. **C. grandiflora,** *Wight Ic.* t. 831, and *Ill.* ii. 169, t. 155 *b*, f. E; glabrous, leaves obovate oblong or elliptic obtuse or mucronate, pale beneath,

nerves 5–6 pairs arched, cymes axillary and terminal few- or many-flowered. C. Wightiana, *Wall. Cat.* 4457. Echites coriacea, *Heyne in Herb. Rottler.*

DECCAN PENINSULA; the Mount, Madras, *Heyne*, &c.; Balaghaut Mts., *Wight*.
Leaves 2–4 by 1–2 in., very variable in form, coriaceous, hardly glaucous beneath, base acute; petiole ½ in. *Cymes* sparingly branched, usually long-peduncled; branches stout, prominently distantly scarred by the fallen bracts. *Sepals* large, ovate, acute. *Corolla* 1 in. diam; tube ventricose, lobes falcate lanceolate. *Coronal scales* clavate. *Follicles* 2–4 in., curved and conniving or straight and divaricate. *Seeds* very large, ¾ in. long, linear-oblong; coma a little longer.

3. **C. elegans,** *Wall. Cat.* 1639; glabrous, leaves oblong or linear-oblong or -lanceolate apiculate, rounded at both ends or acuminate, glaucous beneath, nerves numerous very faint and spreading, cymes axillary and terminal few-flowered. *G. Don Gen. Syst.* iv. 82. C. pauciflora, *Wight Ic.* t. 493. C. laxiflora, *Blume Mus. Bot.* i. 147. Aganosma Edithæ, *Hance in Ann. Sc. Nat. Ser.* 5. v. 227. Echites pauciflora. *Herb. Rottl.* Nerium pauciflorum, *Roxb. Ic. ined.*

SIKKIM; Terai, *J. D. H.* ORISSA, *Heyne.* ASSAM, BENGAL, KHASIA MTS., CHITTAGONG, TENASSERIM and ANDAMAN ISLDS.—DISTRIB. Java, S. China.
A slender climber. *Leaves* 1½–2½ by ¾ in., rarely ovate or linear-lanceolate, tip sometimes retuse, base rarely cordate; petiole ¼–½ in., very slender. *Cymes* 2–4 in., peduncles long, branches few and pedicels slender. *Sepals* ovate, obtuse. *Corolla* yellow, 1–1½ in. diam., tube short, lobes lanceolate, tips twisted. *Coronal scales* clavate. *Follicles* 5–8 in., slender, nearly straight. *Seeds* much as in *C. Buchanani.* —The mss. name of *Apocynum orixense*, in Rottler's Herbarium, indicates the Orissa habitat of this plant. *Flower* fragrant.

3*. CRYPTOSTEGIA, *Br.*

Lofty climbers. *Leaves* opposite. *Flowers* large, in terminal 3-chotomous cymes. *Sepals* lanceolate. *Corolla* funnel-shaped, tube short, throat campanulate; lobes broad, overlapping and twisted to the right. *Coronal scales* at the base of the throat, subulate, entire or 2-cleft. *Filaments* short; anthers adnate to the stigma, acute; pollen-masses in pairs in each cell, granular, appendages subspathulate. *Stigma* convex. *Follicles* thick, divaricate, hard, 3-winged, furrowed between the wings. *Seeds* comose.—DISTRIB. Madagascar.

C. grandiflora, *Br. in Bot. Reg.* t. 435; glabrous, leaves elliptic obtuse, coronal scales cleft into two filiform segments. *Wall. Cat.* 1635; *Wight & Arn. Contrib.* 36; *Wight Ic.* t. 832, and *Ill.* ii. t. 182, f. 9; *Grah. Cat. Bomb. Pl.* 122; *Dalz. & Gibs. Bomb. Pl. Suppl.* 54; *Dcne. in DC. Prodr.* viii. 492; *Miquel Pl. Rar. Jard. Buitenz.* t. 8; *Reichb. Ic. Exot.* t. 132. Nerium grandiflorum, *Roxb. Hort. Beng.* 19, and *Fl. Ind.* ii. 100.

Cultivated in various parts of INDIA.
Branches stout. *Leaves* 3–4 by 1½–2 in., coriaceous, glossy above; nerves many, spreading, arched, faint, base acute; petiole ½–⅔ in. *Cymes* short, spreading, peduncle and branches stout, hoary or glabrous; bracts caducous. *Sepals* ½–⅔ in. *Corolla* pale pinkish purple, tube and throat 1¼ in. long, limb often 2 in. diam., lobes acute. *Follicles* 4–5 by 1–1½ in., broadest near the base, straight, woody. *Seeds* ¼ in. long, oblong-ovate, compressed, narrowed upwards; coma 1½ in., very fine.—Supposed to be a native of Africa or Madagascar, from which latter country another species is described with leaves pubescent beneath and entire coronal scales, but this is only known from Mauritian garden specimens. Schweinfurth found *C. grandiflora* cultivated at Khartum on the Nile.

4. **BRACHYLEPIS,** *Wight & Arn.*

A pubescent or tomentose twining shrub. *Leaves* opposite. *Flowers* small, villous, in terminal or axillary dichotomous cymes. *Sepals* ovate, glandular within. *Corolla* rotate, 5-cleft; lobes short, overlapping and twisted to the right. *Coronal scales* 5, broad, membranous, close to the stamens. *Anthers* sessile, cohering in a fleshy ring, tips acute conniving; pollen-masses in pairs in each cell, granular; appendages of the corpuscles orbicular. *Stigma* 5-angled, top flat. *Follicles* divaricate, acuminate, thick, smooth.

B. nervosa, *Wight & Arn. Contrib.* 64; *Wight Ic.* t. 1284; *Dcne. in DC. Prodr.* viii. 495; *Deless. Ic. Sel.* v. t. 56.—Tylophora sp., *Miquel in Pl. Hohen.* n. 1389.

NILGHERRY MTS., alt. 5–7500 ft., common, *Wight*, &c.

Leaves 3–4 by 1–2 in., elliptic or ovate, acuminate, base acute or rounded, coriaceous, glabrous and glossy above; nerves 8–10 pairs, spreading and arched; petiole stout, $\frac{1}{2}$ in. *Cymes* villous, peduncles and pedicels short, stout; bracts persistent; bracteoles numerous, imbricate. *Corolla* $\frac{1}{6}$ in. diam., green outside, purple within, lobes ovate. *Follicles* not seen.

5. **UTLERIA,** *Beddome.*

A glabrous tree. *Leaves* scattered, narrow, subcrenulate. *Flowers* minute, towards the ends of the long branches of terminal peduncled dichotomous cymes. *Sepals* rounded, glandular within. *Corolla* subrotate, 5-cleft, lobes overlapping and twisted to the right. *Coronal scales* 5, small, opposite and close to the stamens. *Filaments* short; anthers ovate, conniving over and adnate to the stigma; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex. *Fruit* unknown.

U. salicifolia, *Beddome mss.*

DECCAN PENINSULA; Anamallay Mts., alt. 3–4000 ft., *Beddome.*

Branches stout. *Leaves* crowded at the ends of the branches, 7–9 by $\frac{1}{2}$–1 in., narrowly lanceolate, acuminate, coriaceous, margin thickened waved or crenulate, base very acute; nerves many, very slender, nearly horizontal, reticulations fine; petiole 1–2 in. *Cymes* 4–6 in., sparingly branched; bracts on the terminal branches numerous, imbricate, obtuse; pedicels short. *Corolla* $\frac{1}{10}$ in. diam., lobes ovate, acute.

6 **FINLAYSONIA,** *Wall.*

A lofty glabrous climber. *Leaves* opposite. *Flowers* in 2–3-chotomous axillary cymes, yellowish and purple. *Sepals* rounded, short. *Corolla* rotate, 5-cleft; lobes ovate, overlapping to the right. *Coronal scales* 5, close to the stamens, filiform. *Stamens* on the throat of the corolla, filaments slender; anthers adnate by the middle to the stigma, beardless, tip membranous inflexed acute. *Pollen-masses* in pairs in each cell, granular; tips of the corpuscles slightly dilated. *Stigma* 5-angled, top flat. *Follicles* divaricate, turgid, narrowed at both ends, 1–3 winged, tip with a revolute beak. *Seeds* margined with soft retrorse hairs.

F. obovata, *Wall. Pl. As. Rar.* ii. 48, t. 162, and *Cat.* 4466; *Wight & Arn. Contrib.* 65; *Wight Ill.* t. 182, f. 5; *Griff. Notul.* iv. 70, and *Ic. Pl. Asiat.* t. 407; *Dcne. in DC. Prodr.* viii. 494. Gurua obovata, *Ham. in Voigt Hort. Sub. Calc.* 544.

From the SUNDERBUNDS to TENASSERIM and MALACCA; *Wallich*, &c.

Branches stout. *Leaves* 3–4 by 1½–2½ in., obovate-oblong or oblanceolate, obtuse or apiculate, thickly coriaceous, reticulate beneath, base acute; nerves very numerous, horizontal, very slender; petiole ½–1 in. *Cymes* 2–3 in. long; peduncle and branches very thick; bracts short, persistent; pedicels short, thick. *Corolla* ⅓ in. diam., lobes bearded within. *Follicles* 3 by 2 in., distantly ribbed between the wings, pericarp thin. *Seeds* ¾ in. long, flat, obovate-oblong, hairs brown.—*Flowers* fœtid (Voigt).

7. ATHEROSTEMON, *Blume.*

A very slender glabrous twining shrub. *Leaves* opposite. *Flowers* in axillary and terminal slender peduncled dichotomous cymes. *Calyx* minute, tube turbinate, eglandular within. *Corolla* rotate; lobes long, slender, overlapping to the right, straight and forming an oblong-cylindric bud. *Coronal* processes 5, filiform, at back of the bases of the filaments. *Stamens* at the base of the corolla; filaments very short, distinct, without interposed glands or teeth; anthers conniving over and adnate to the stigma, tips membranous, acute; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* rounded. *Fruit* unknown.

A. javensis, *Blume Mus. Bot.* i. 126, t. 23.

TENASSERIM; banks of the Gyna, Moulmein, *Lobb.*—DISTRIB. Java.

Leaves 2–3½ by ¾–1¾ in., oblong-elliptic or linear-oblong, apiculate, glaucous beneath, base obtuse or rounded; nerves 6–10 pairs, very slender, arched; petiole slender, ⅓–½ in. *Cymes* much longer than the leaves; peduncle long and slender, branches filiform; bracts minute; flowers very few, distant; pedicels capillary, tip turbinate. *Calyx-lobes* small, rounded, membranous, with sometimes a very obscure scale in the sinus. *Corolla-lobes* long, linear, obtuse, ¾ in. long, erect and recurved. *Stamens* very minute.

8. ATHEROLEPIS, *Hook. f. Nov. Gen.*

A pubescent slender climber. *Leaves* opposite, very narrow, membranous. *Flowers* very small, in very short few-flowered axillary pubescent cymes. *Calyx* ½-superior, tube turbinate; lobes short, eglandular within. *Corolla* rotate; lobes triangular, overlapping to the right. *Coronal scales* 5, subulate, at the back of the stamens. *Stamens* at the base of the corolla; filaments very short, distinct, with interposed rounded glands; anthers oblong, conniving over and adherent to the stigma, tips obtuse, connate; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Ovary* half sunk in the calyx-tube and adherent to it; stigma small, tip obtuse. *Fruit* unknown.

A. Wallichii, *Hook. f.* Atherandra Wallichii, *Benth. in Gen. Plant.* ii. 744. Hemidesmus Wallichii, *Wight & Arn. Contrib.* 63; *Wall. Cat.* 8245; *Dcne. in DC. Prodr.* viii. 495.

PEGU, at Prome, *Wallich*; Rangoon, *M'Clelland.*

Branches glabrous below. *Leaves* 3–7 by ½–1¼ in., narrow, oblong or linear-lanceolate, acute or acuminate, puberulous above, softly pubescent beneath; base acute; nerves rather distant, spreading, slightly arched, very slender; petiole ⅛ in. *Cymes* shorter than the petioles; bracts minute; pedicels very short, top turbinate. *Corolla* $\frac{1}{10}$ in. diam., shortly conic in bud, lobes glabrous within. *Filaments* alternating with obscure low glands.—The habit, foliage, inflorescence, eglandular calyx, obtuse anthers and short stigma well distinguish this from *Atherandra.*

9. **ATHERANDRA,** *Dcne.*

Slender glabrous twining shrubs. *Leaves* opposite. *Flowers* in axillary and terminal slender peduncled dichotomous cymes. *Calyx-tube* turbinate, lobes with quadrate crenulate glands within. *Corolla* rotate; lobes long, slender, overlapping and sharply twisted to the right, forming a long-beaked bud. *Coronal* processes 5, filiform, at the back of the bases of the filaments. *Stamens* at the base of the corolla; filaments distinct, alternating with large erect glands; anthers sagittate, conniving over and adnate to the stigma, tips elongate, filiform; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Ovary* partly sunk in the broad calyx-tube; stigma elongate-conical, 2-fid. *Fruit* unknown.

A. acutifolia, *Dcne. in DC. Prodr.* viii. 497. A. pubescens, *Blume Mus. Bot.* i. 147, t. 2. A. cuspidata, *Blume l. c.* Cryptolepis filiformis, *Wall. Cat.* 4458.

PENANG, *Wallich.*—DISTRIB. Java.

Branches and leaves beneath glabrous or sparingly pubescent. *Leaves* 1–2 by 1–1½ in., oblong or obovate-oblong, finely abruptly acuminate; nerves 6–8 pairs, strong beneath, arched; petiole ⅛–¼ in. *Cymes* numerous, quite glabrous, spreading, longer than the leaves; bracts small, deciduous; pedicels thickened towards the turbinate tip. *Calyx-lobes* ovate, acute, erect or reflexed. *Corolla* ½–¾ in. diam., long and slenderly beaked in bud.

10. **STREPTOCAULON,** *Wight & Arn.*

Twining tomentose herbs or shrubs. *Leaves* opposite. *Flowers* small or minute, in lax sessile or peduncled trichotomous panicled cymes. *Calyx* minute, glandular within. *Corolla* rotate; lobes ovate, overlapping to the right; buds shortly conical. *Coronal-scales* 5, filiform, adnate to the back of the filaments. *Stamens* at the base of the corolla; filaments very short, alternating with minute teeth; anthers conniving over and adnate to the stigma, tip with an obtuse triangular process; pollen-masses in pairs in each cell, granular; appendages of the minute corpuscles dilated. *Stigma* convex, 2-lobed. *Follicles* divaricate, terete, smooth, not winged.—DISTRIB. Species 6; Indian and Malayan.

1. **S. Kleinii,** *Wight & Arn. Contrib.* 65; shrubby, climbing, leaves cuneate-obovate base cordate with softly appressed white tomentum beneath, nerves 7–10 pairs, cymes pubescent shorter than the leaves. *Dcne. in DC. Prodr.* viii. 496.

DECCAN PENINSULA; *Klein.*

Leaves 2–3 by 1–1¾ in., coriaceous, above puberulous closely reticulated with sunk nerves, beneath pale buff when dry; nerves and reticulation faintly seen through the tomentum; petiole ⅙–¼ in. *Cymes* with a stout peduncle ½–1½ in., sparingly shortly di-tri-chotomously branched, branchlets very short 1–2-fid; bracts tomentose, persistent. *Sepals* hirsute, ovate, subacute, 1–2-glandular. *Corolla* ⅙ in. diam.; lobes ovate, subacute, sparingly hirsute externally, glabrous within.

2. **S. Wallichii,** *Wight & Arn. Contrib.* 65; shrubby, climbing, leaves broadly or narrowly elliptic acute at both ends finely acuminate softly brown-tomentose beneath, nerves 6–8 pairs, cymes much branched many-fid. hispidly pubescent, flowers quite glabrous. *Wall. Cat.* 8249; *Dcne. in DC. Prodr.* viii. 496.

PENANG, *Phillips, Maingay* (Kew Distrib. 1100), &c. SINGAPORE, *Wallich.*

Branches stout, young densely shortly pubescent; bark brown, lenticellate. *Leaves* 2–3 by 1–2 in., very variable in breadth, coriaceous, opaque and puberulous above, reticulations minute; nerves faint beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* spreading, 1–2 in. long and broad; 2–3-chotomously branched; branches divaricate, slender, ultimate with persistent sometimes imbricate minute bracts; pedicels slender, tips turbinate. *Sepals* glabrous, minute, obtuse. *Corolla* $\frac{1}{10}$ in. diam., red, lobes broad acute. *Follicles* 3 by $\frac{1}{3}$ in. divaricate, straight, acuminate, pubescent. *Seeds* $\frac{1}{4}$ in., oblong, narrowed below the tip; coma $1\frac{1}{4}$ in.

3. **S. tomentosum,** *Wight & Arn. Contrib.* 64; shrubby, climbing, leaves cuneate elliptic or oblanceolate acuminate base rounded or truncate, softly fulvous-tomentose beneath, nerves 16–20 pairs, cymes many-flowered densely pubescent, corolla quite glabrous. *Wight Ill.* t. 182 f. 2.; *Wall. Cat.* 8248; *Dcne. in DC. Prodr.* viii. 496.

AVA, at Taongdong and MOULMEIN, *Wallich.* PEGU, *M'Clelland.* DISTRIB. Yunan. Cochinchina.

Branches smooth, ultimate finely densely pubescent. *Leaves* very variable in breadth, 3–5 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., usually broadest beyond the middle and truncate at the base, puberulous above; nerves straight, prominent or concealed in the tomentum beneath; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Cymes* short, 1 in. long and broad or less, branches divaricate; bracts persistent. *Sepals* pubescent. *Corolla* $\frac{1}{10}$ in.; lobes broad ovate, acute. *Fruit* unknown.

4. **S. Griffithii,** *Hook. f.*; shrubby, climbing, leaves obovate-oblong or oblanceolate acuminate base cordate, scaberulous above, densely rusty-tomentose beneath, nerves 14–18 pairs, cymes hispidly tomentose, corolla glabrous. Streptocaulon, *Griff. Notul.* iv. 71, *& Ic. Pl. As.* t. 406.

TENASSERIM, *Helfer* (Kew Distrib. 3754, under *tomentosum*); Mergui, *Griffith.*

Branches stout, lenticellate, ultimate hispidly tomentose. *Leaves* 3–6 by $1\frac{1}{2}$–2 in., variable in form, often broadest above the middle, hard and coriaceous, finely impressedly reticulate above; nerves and reticulations, usually prominent beneath. *Cymes* 1–2 in. long and broad, densely hispid, branches rather stout divaricate; bracts persistent; pedicels short. *Calyx* strigose. *Corolla* $\frac{1}{6}$ in. diam.; lobes broad, acute. *Follicles* 3–4 by $\frac{1}{2}$ in., straight, acute, finely pubescent. *Seeds* nearly $\frac{1}{2}$ in., narrowly oblong, coma 1 in.

5. **S. sylvestre,** *Wight Contrib.* 65; herbaceous, prostrate, leaves subsessile orbicular or broadly ovate pubescent or tomentose beneath, base rounded or cordate, nerves 6–7 pairs, cymes small few-fld., corolla nearly glabrous. *Wall. Cat.* 8251; *Dcne. in DC. Prodr.* viii. 496.

BENGAL, *Hamilton*; foot of the SIKKIM HIMALAYA, *Clarke.*

Root woody, giving off many slender pubescent flexuous branches, 12–18. in. long with distichous leaves that lie flat on the ground. *Leaves* 1–$1\frac{1}{2}$ in. long and nearly as broad, apiculate, glabrous or puberulous above; nerves arched, prominent beneath. *Cymes* $\frac{1}{2}$ in., pubescent; peduncle slender; branches and pedicels short, not spreading; bracts minute; *Calyx* small, strigose. *Corolla* $\frac{1}{2}$ in. diam., purple, very slightly pubescent, lobes lanceolate acute. *Fruit* unknown.

11. **MYRIOPTERON,** *Griff.*

A glabrous or pubescent slender twining shrub. *Leaves* opposite, long-petioled. *Flowers* small, in lax paniculate cymes from opposite axils. *Sepals* minutely glandular within. *Corolla* rotate; lobes narrow, overlapping to the right, twisted to the left, broadly conic in bud. *Coronal scales* 5, at the back of the filaments, filiform from a broad base. *Stamens* at the base of the corolla,

filaments connate below into a ring with alternating teeth; anthers conniving over and adherent to the stigma, tips membranous; pollen-masses in pairs in each cell, appendages of the corpuscles 2-fid. *Stigma* convex, 2-fid. *Follicles* short, turgid, straight; with many longitudinal membranous wings. *Seeds* comose.

M. paniculatum, *Griff. in Calc. Journ. Nat. Hist.* iv. 385; *& Notul.* iv. 71. *& Ic. Pl. Asiat.* 408. Streptocaulon extensum, *Wight Contrib.* 65, *& Ill.* t. 182. f. 3.; *Dcne. in DC. Prodr.* viii. 496. S. Horsfieldii, *Miq. Fl. Ind. Bat.* ii. 470. Vicarya cristata, and Jenkinsia cristata, *Wall. mss. in Voigt Hort. Sub. Calc.* 544.

ASSAM, CHITTAGONG, PEGU, and TENASSERIM. DISTRIB. Java.

Branches smooth, herbaceous. *Leaves* $3\frac{1}{2}$–5 by 2–$2\frac{1}{2}$ in., very variable in length and breadth, rounded oblong or elliptic, acuminate or subcaudate, base rounded or acute, membranous, finely pubescent or glabrate beneath; nerves 5–7 pairs, slender, arched; petiole very slender, $\frac{1}{2}$–$1\frac{1}{2}$ in. *Cymes* 3–7 in., peduncle and brachiate branches very slender, quite glabrous; bracts few, chiefly at the forks; pedicels capillary, top turbinate. *Sepals* minute, rounded, ovate. *Corolla* $\frac{1}{3}$ in. diam.; lobes lanceolate. *Follicles* 3 by $\frac{3}{4}$ in., straight, narrowed to the obtuse tip, base rounded, pericarp thin. *Seeds* $\frac{1}{3}$ in. long, ovoid, narrowed to the tip, coma 1 in.—*M. Horsfieldii*, agrees with the perfectly glabrous leaved states of the plant from Tenasserim. 3985

12. DECALEPIS, *Wight & Arn.*

A glabrous twining shrub. *Leaves* opposite. *Flowers* small, in axillary peduncled cymes. *Calyx* eglandular within. *Corolla* rotate; lobes valvate, bearded within, ovoid in bud. *Coronal scales* 5, ovate, adnate to the back of the base of the filaments. *Stamens* at the base of the corolla, filaments connate at the base with alternating minute glands; anthers ovate, conniving over and adnate to the stigma, tip acute inflexed; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex, 5-grooved. *Fruit* unknown.

D. Hamiltonii, *Wight & Arn. Contrib.* 64; *Wight Ill.* t. 182. f. 6.; *& Ic.* t. 1285; *Dcne. in A. DC. Prodr.* viii. 495. Streptocaulon Hamiltonii, *Wight mss.* Apocynum reticulatum, *Herb. Madr.*; *Wall. Cat.* 8247.

DECCAN PENINSULA; Balaghaut Mts. near Madras; Anamallay hills, *Wight.*

Branches stout, smooth. *Leaves* coriaceous, orbicular or elliptic-obovate, tip rounded, base acute or rounded, finely reticulated; nerves 6–8 pairs, strongly arched; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* in single axils, glabrous or puberulous; peduncle $\frac{1}{2}$ in.; branches few, short, spreading; bracts persistent, scattered or subimbricate. *Sepals* oblong, obtuse. *Corolla* $\frac{1}{4}$ in. diam., coriaceous; lobes ovate-oblong, subacute, beard dense white.

13. PERIPLOCA, *Linn.*

Erect or twining glabrous sometimes leafless shrubs. *Leaves* opposite. *Flowers* in lax terminal or axillary cymes, greenish externally, purplish within. *Calyx* 5-glandular within. *Corolla* rotate; lobes obtuse, usually bearded within, overlapping to the right. *Coronal scales* connate into a 10-lobed ring often produced behind the stamens into 5 subulate or branched processes. *Stamens* within the corona, filaments broad short flat; anthers bearded on the back, conniving over and adhering to the stigma, tips cohering, with incurved appendages; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex. *Follicles* conniving spreading or divaricate, cylindric, smooth. *Seeds* comose. DISTRIB. S. Europe, West Asia and Africa, Species 12.

1. **P. aphylla,** *Dcne. in Jacq. Voy. Bot.* 109. t. 116; and in *DC. Prodr.* viii. 499; erect, leafless or nearly so, flowers purple, coronal lobes very long filiform glabrous. *Boiss. Fl. Orient.* iv. 50. Campelepis viminea, *Falc. in Trans. Linn. Soc.* xix. 109, in note.

WESTERN PANJAB, in the plains, *Falconer*, &c. SCIND, *Stocks*. DISTRIB. Affghanistan, Persia, Arabia, Nubia.

A shrub; branches as thick as a goose-quill or less, smooth or tips pubescent. *Leaves*, if present, $\frac{1}{4}$ in., oblong, acute, very thick, nerveless. *Cymes* often opposite, $\frac{1}{2}$–1 in. long and broad, branched from the base or on short thick peduncles, glabrous; branches short, thick; bracts caducous. *Sepals* broad, rounded-ovate. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., dark purple, glabrous externally, lobes ovate-oblong, densely bearded above the middle within. *Follicles* $\frac{3}{4}$ by $\frac{1}{4}$ in., rigid, woody, terete. *Seeds* $\frac{1}{4}$ in., narrowly oblong; coma 1 in.—"Used for cordage; flowers fragrant, eaten by natives, taste like raisins" (*Stocks*).

2. **P. hydaspidis,** *Falc. in Ann. & Mag. of Nat. Hist.* viii. 449; twining, leafless or nearly so, flowers yellow, coronal lobes subulate hairy. *Dcne. in DC. Prodr.* viii. 498.

WESTERN HIMALAYA; Southern Kashmir and Kishtwar, ascending to 4000 ft., and the adjacent PANJAB, *Falconer, Thomson*, &c. DISTRIB. Affghanistan.

Quite glabrous. *Branches* tortuous, wiry, sometimes fascicled, as thick as a crow-quill, smooth. *Leaves* (if present) $\frac{1}{6}$–$\frac{1}{4}$ in., linear, subacute, thick, nerveless. *Cymes* $\frac{1}{2}$–1 in. long and broad, often opposite, very numerous; peduncle stout, erect, branches divaricate; bracts caducous. *Sepals* rounded, quite glabrous. *Corolla* $\frac{1}{4}$ in. diam.; lobes oblong, obtuse, pubescent or villous within, glabrous externally. *Follicles* (old only seen) broader and less woody than in *P. aphylla*.

3. **P. calophylla,** *Falc. in Ann. & Mag. Sc. Nat.* viii. 449; twining, quite glabrous, leaves narrowly lanceolate caudate-acuminate, nerves very many horizontal, flowers yellow or pinkish, coronal lobes hairy. *Brandis For. Fl.* 330. *Dcne. in DC. Prodr.* viii. 498. Streptocaulon calophyllum, *Wight Contrib.* 65, and *Ill.* t. 182, f. 1; *Wall. Cat.* 8252.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 3–5000 ft. from Kumaon to Sikkim, KHASIA MTS. alt. 4000 ft.

A small shrub, branches slender. *Leaves* 1$\frac{1}{2}$–3 by $\frac{1}{3}$–$\frac{2}{3}$ in., coriaceous, shining on both surfaces, margin undulate; petiole $\frac{1}{4}$ in. *Cymes* numerous, often in opposite axils, sessile, $\frac{1}{2}$–1 in. long and broad; branches and pedicels slender; bracts caducous. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{4}$ in. diam., lobes ovate-oblong acute. *Follicles* 4–8 by $\frac{1}{4}$ in., quite straight or curved, parallel or divergent, never divaricate, smooth, terete; pericarp thin but firm. *Seeds* $\frac{1}{2}$–$\frac{2}{3}$ in. long, linear; coma 1–1$\frac{1}{2}$ in.

TRIBE 2. **SECAMONEÆ.**

14. **SECAMONE,** *Br.*

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. *Flowers* small or minute, in sessile or shortly peduncled lax axillary 2–3-chotomous cymes. *Corolla* rotate, 5-cleft; lobes (in Indian species) overlapping to the right. *Coronal scales* 5, adnate to the staminal tube, laterally compressed, tips free. *Filaments* short, connate; anther-tips small, membranous, inflexed; pollen-masses in pairs in each cell, small, globose, waxy, corpuscles minute. *Stigma* beaked, 2-fid, or low and conical. *Follicles* stout or slender, acuminate, smooth, terete or angled. DISTRIB. Species about 24, tropical Asia, Australia, and Mascarene Islands.

S. emetica, *Br. in Mem. Wern. Soc.* i. 56; slender, glabrous, except the puberulous cymes, climbing, leaves lanceolate, or linear- or elliptic- lanceolate subacute narrowed into the short petiole, cymes much shorter than the leaves, corolla glabrous, coronal-scales broadly subulate incurved much shorter than the column, stigma 2-lobed, follicles slender straight terete narrowed from the base to the tip. *Dcne. in DC. Prodr.* viii. 501; *Wight Contrib.* 60; *Ic.* t. 1283, and *Ill.* t. 155. *b. fig. D.*; *Wall. Cat.* 8236. *Periploca emetica, Retz. Obs.* ii. 14.

Mountains of the SOUTH DECCAN PENINSULA and CEYLON.

Leaves $1\frac{1}{2}$–3 by $\frac{1}{8}$–$\frac{1}{2}$ in., rather glaucous beneath, nerves very faint. *Cymes* few- or many-fld.; peduncle $\frac{1}{6}$–$\frac{1}{8}$ in. *Sepals* ciliolate. *Corolla* $\frac{1}{8}$ in. diam., segments oblong, obtuse, bases saccate. *Follicles* 2–$2\frac{1}{2}$ in.—*S. Finlaysoni*, Wight; *Wall. Cat.*, a native of Siam, has much broader leaves and longer cymes.

15. TOXOCARPUS, *Wight & Arn.*

Twining shrubs. *Leaves* opposite. *Flowers* small, in axillary dichotomous cymes. *Calyx* minute; lobes oblong, obtuse. *Corolla-tube* short; lobes narrow, spreading and recurved, glabrous, overlapping to the left. *Coronal scales* minute, obtuse or acute, adnate to the column. *Filaments* connate; anthers small, retuse, often inappendiculate; pollen-masses 2 in each cell, very minute, pendulous, waxy. *Stigma* produced far beyond the column. *Follicles* smooth. *Seeds* comose. DISTRIB. Species about 14, tropical Asiatic and African.

I am unable to determine accurately from herbarium specimens the characters of the very minute staminal column and its scales in this genus.

* Cymes rusty-pubescent. Corolla-segments without an adnate scale.

† *Corolla-segments villous or hairy at the base only.*

1. **T. villosus,** *Dcne. in DC. Prodr.* viii. 506; leaves elliptic-oblong subacute or cuspidate rusty-pubescent beneath, cymes lax, coronal scales with subulate tips overtopping the anther-cells, stigma slender quite entire. *Miq. Fl. Ind. Bot.* ii. 475. Secamone villosa, *Blume Bijd.* 1050.

TENASSERIM; Mergui, *Griffith.*—DISTRIB. Java.

Leaves 2–$3\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., base acute, glabrous in age; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cyme-branches* stout and sepals densely villous. *Corolla* $\frac{1}{2}$ in. diam., segments slightly hairy at the base.

2. **T. Griffithii,** *Dcne. in DC. Prodr.* viii. 505; leaves elliptic-oblong or lanceolate cuspidate, young glabrous beneath, cymes short, coronal scales not overtopping the anther-cells, stigma short enlarged upwards, tip notched. Toxocarpus sp. *Griff. Notul.* iv. 69, and *Ic. Pl. Asiat.* t. 404 (*Asclepiadeæ*),—Connaracea, *Wall. Cat.* 8550.

TENASSERIM, *Griffith, &c.* MALACCA, *Maingay* (Kew distrib. 1105). SINGAPORE, *Lobb.* PENANG, *Porter.*

Leaves 2–4 by 1–2 in., base acute or rounded; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* few-fld. *Corolla-segments* slightly hairy at the base, the hairs disposed in a triangle like the adnate scale of *T. acuminatus*. *Follicles* 12 in., very slender, flexuous, cylindric. *Seeds* 1 in., very slender, not beaked.

2630 3. **T. himalensis,** *Falc. mss.*; leaves elliptic-oblong or lanceolate or orbicular obtusely cuspidate, young pubescent beneath, coronal scales overtopping the anther-cells, stigma slender unequally 2-fid.

WESTERN HIMALAYA; Chaumussoore, *Falconer*. ASSAM and KHASIA MTS., *Jenkins*, *Griffith*, *H. f.* & *T.* &c.

Leaves 3–5 by 1½–3 in., quite glabrous when old, base acute or rounded, petiole ½–⅔ in. *Corolla* ⅓ in. diam.; lobes membranous, slender, villous at the base within. *Follicles* 4–6 by ½–⅔ in., young rusty-pubescent. *Seeds* ovate, beaked, ⅔ in. long.—The only Himalayan specimen is Falconer's, and probably from Garwhal.

†† *Corolla-segments glabrous throughout.*

4. **T. Roxburghii,** *W. & A. Contrib.* 61; stem cymes and calyx sparsely hirsute, leaves broadly elliptic cuspidate membranous glabrous base subacute, cymes spreading much shorter than the leaves, flowers few sessile, coronal scales acute hardly overtopping the anther-cells, stigma fusiform. *Wight Ic.* t. 475; *Wall. Cat.* 8239; *Dcne. in DC. Prodr.* viii. 505; Asclepias longistigma, *Roxb. Fl. Ind.* ii. 46.

THE CIRCARS, *Heyne*; *Roxburgh.*

Leaves 2½ 3 by 1½–2 in., midrib sparsely puberulous beneath; petiole ¼–½ in. and nerves very slender. *Cymes* shortly peduncled; flowers solitary or clustered, ¼ in. diam.; bracts very minute.—I am in doubt about this plant, for which Wight cites n. 1561 as his catalogue number, for the solitary specimen in his "Herbarium" has no number, locality, or collector's name attached. Good specimens are however in Rottler's "Herbarium," sent by Heyne as *Echites dichotoma*, Herb. Heyne (not the plant published under that name), and in Wallich's also from Heyne. Roxburgh gives no locality for it in his "Flora," but Wight gives the Circars on Roxburgh's authority. The flowers in his (Roxburgh's) drawing are twice as large as in the specimens. Wight and Arnott and Decaisne describe the corolla-throat as hirsute, which is perfectly glabrous in Roxburgh's drawing and in the specimens; and the cymes as longer than the leaves, whereas they are much shorter. As a species it is very near *T. Kleinii*, but is a much more slender less villous plant, with very short coronal scales.

5. **T. Kleinii,** *Wight & Arn. Contrib.* 61; leaves from elliptic-ovate or obovate or lanceolate to orbicular acuminate or cuspidate glabrous or pubescent beneath base acute, cymes spreading and calyx densely tomentose, flowers few sessile and pedicelled, coronal scales overtopping the anther-cells, stigma long fusiform tip slender notched. *Wight Ic.* t. 886; *Dcne. in DC. Prodr.* viii. 505.

Hills of the DECCAN PENINSULA, from the Concan southwards. CEYLON; Maturatte district alt. 3000 ft. *Thwaites*; Galle, *Champion.*

Very near *T. Roxburghii*, but stouter, with more coriaceous leaves, longer more densely tomentose cymes, larger usually pedicelled flowers ⅓ in. diam., less membranous calyx and corolla, and longer coronal scales. *Follicles* quite glabrous, more or less curved, some 3 by ⅓ in. and flattened, others 7 by ⅓ in. and nearly cylindric. *Seeds* ⅓ in. ovate, hardly beaked.—In some specimens, both Peninsular and Ceylonese, the leaves are narrow, 2 by ½ in., quite glabrous and shining on both surfaces, in others they are 2½ in. long and broad, rusty-pubescent beneath. I do not find the tube of the corolla to be pubescent within as figured by Wight.

6. **T. concanensis,** *Hook. f.*; leaves obovate or elliptic cuspidate mottled and glabrous or pubescent beneath, cymes densely tomentose much branched many-fld., coronal scales hardly overtopping the anther-cells, stigma long slender.

CANARA; on the Bababoodan hills, *Law.*

This again closely resembles *T. Kleinii*, but the leaves are much larger, 3–5 by 2½–3 in., more obovate, with petioles ½–⅔ in. long, and the cymes are more divided, very many-flowered, densely tomentose. The leaves are dark green, minutely mottled between the nerves beneath in a branching reticulated manner, a character I do not

find in its allies, though there are traces of it in *T. Kleinii.* Fragment of a follicle cylindric, glabrous.

7. **T. Kurzii,** *Hook. f.*; leaves large broadly elliptic-ovate broadly cuspidate coriaceous shining, cymes small, flowers few sessile, calyx nearly glabrous, coronal scales obtuse hardly overtopping the anther-cells, stigma long slender.

MIDDLE ANDAMAN ISLAND, *Kurz.*

I have seen but one specimen, which is nearest to *T. Kleinii*, differing in the large (4–5 by 2½–3 in.) coriaceous leaves, long (⅔ in.) petioles and nearly glabrous calyx.

** Corolla lobes with a triangular erose scale adnate to their bases.

8. **T. acuminatus,** *Benth. in Gen. Pl.* ii. 747; leaves elliptic-lanceolate acuminate quite glabrous shining base acute, cymes branching from the base branches and branchlets very long slender few-fld., flowers pedicelled. Goniostemma acuminatum, *Wight Contrib.* 62; *Wall. Cat.* 8242; *Dcne. in DC. Prodr.* viii. 504.

SILHET, *Wallich.*

Stem glabrous, pustular. *Leaves* 4–5 by 1¼–1½ in., shining on both surfaces; nerves many, faint, spreading; petiole ⅓–½ in. *Cymes* almost glabrous, nearly equalling the leaves; pedicels very slender; bracts very minute. *Sepals* very small, rounded. *Corolla* ¼ in. diam., quite glabrous, lobes lanceolate twice as long as the tube. *Coronal scales* triangular, shorter than the column. *Stigma* long, fusiform.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

T. ERIOCARPUS, *Hook. f.*; leaves elliptic-oblong or oblong-lanceolate acute at both ends quite glabrous, petiole slender, nerves slender very oblique, follicles long curved terete finely pubescent, seeds linear-oblong tip not contracted.

TRAVANCORE; at Courtallan, *Wight.*

Branches glabrous, woody. *Leaves* 2½–3 by 1–1½ in. firm, pale when dry; petiole ⅓–½ in. *Flowers* not seen. *Follicles* 5–7 by ⅓ in. woody. *Seeds* ¾ in. long.

T. ROXBURGHII, *Griff. Notul.* iv. 68; *Ic. Pl. Asiat.* t. 386a f. 4, 5, *not of W. & A.* from Mergui. This, though referred by Griffith to Roxburgh's *Asclepias longistigma* (*T. Roxburghii*, W. & A.), is certainly not that plant, and is, I suspect, *T. Griffithii.*

? T. WIGHTIANUS, *Hook. & Arn. Bot. Beech. Voy.* 200; *Dcne. in DC. Prodr.* viii. 506; stem very slender, young densely rusty-tomentose, leaves small 1–1½ in. elliptic oblong cuspidate glabrous above rusty-pubescent beneath, base rounded, nerves 2-4 pairs, slender oblique, petiole ⅙ in.—Specimens in leaf only collected by Dr. Thomson and myself at the Bor-panee river, Khasia Mts. alt. 2000 ft., quite resemble the Chinese *T. Wightianus*, which may be known by its very small cymes of flowers, like those of *T. himalensis*, and its short tomentose pods.

16. **GENIANTHUS,** *Hook. f., Gen. Nov.*

Twining shrubs. *Leaves* opposite. *Flowers* small, in axillary subsimple or dichotomously branched cymes. *Calyx* minute, lobes oblong obtuse. *Corolla-tube* short; lobes narrow, spreading and recurved, villous to the tip on the inner face, valvate. *Corona* of 5 scales adnate to the column. *Staminal-column* minute; pollen-masses 2 in each cell, minute, waxy. *Stigma* sessile and capitate, or long and slender.—DISTRIB. Species 3 or 4 tropical Asiatic and Malayan.

This genus is distinguished from *Toxocarpus* by the bearded corolla-lobes and valvate æstivation.

* *Stigma sessile, capitate. Cymes very compound.*

1. **G. laurifolius,** *Hook. f.*; leaves glabrous broadly elliptic obtusely acuminate, base acute, petiole slender, cymes rusty-tomentose much branched many-fld., coronal scales obtuse hardly overtopping the anther-cells. Toxocarpus laurifolius, *Wight Contrib.* 61, and *Ic.* t. 598; *Wall. Cat.* 8241; *Dcne. in DC. Prodr.* viii. 506. T. crassifolius, *Dalz. & Gibs. Bomb. Fl.* 148. Asclepias laurifolia, *Roxb. Fl. Ind.* ii. 49.

SIKKIM HIMALAYA, in hot valleys, *J. D. H. & T. T.* CHITTAGONG to PEGU, *Roxburgh, Kurz,* &c. CONCAN and CANARA, *Stocks,* &c.

Stem glabrous, pustular. *Leaves* 3–4 by 2–3 in. or larger; nerves slender, spreading; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Cymes* very variable, 1–4 in. long and broad; flowers $\frac{1}{10}$–$\frac{1}{8}$ in. diam., sessile and pedicelled, of two forms on the same cyme, one small with narrow densely bearded segments, the other much larger with broader oblong nearly glabrous segments. *Follicles* in Roxburgh's figure 5 by $\frac{1}{6}$ in., very slender, terete, straight.—Wight & Arnott give Cawnpore, Genl. Hardwicke, as a locality for this, but I suspect some mistake.

** *Stigma elongate, columnar. Cymes subsimple, branches long stout with distant clusters of sessile flowers.*

2. **G. crassifolius,** *Hook. f.*; branches cymes and midrib beneath rusty-tomentose, leaves thickly coriaceous broadly elliptic acute or acuminate, coronal scales overtopping the anther-cells. Toxocarpus crassifolius, *Wight Contrib.* 61; *Wall. Cat.* 8240; *Dcne. in DC. Prodr.* viii. 506.

SILHET, *Wallich.*

Leaves 3–5 by 2–$2\frac{1}{2}$ in., base rounded or subacute, margins narrowly recurved, nerves very spreading; petiole stout, $\frac{1}{2}$–$\frac{2}{3}$ in. *Cymes* simple, or twice or thrice branched, stout, flexuous, as long as the leaves; flowers $\frac{1}{8}$ in. diam. *Stigma* very stout, subclavate.

3. **G. Maingayi,** *Hook. f.*; branches and cymes rusty-pubescent, leaves glabrous oblanceolate obtusely acuminate, coronal scales overtopping the anther-cells.

SINGAPORE, *Maingay* (Kew Distrib. n. 1106).

Leaves $2\frac{1}{2}$–$3\frac{1}{2}$ by $1\frac{1}{4}$–$1\frac{1}{2}$ in., coriaceous, narrowed into the petiole, midrib beneath glabrous or pubescent, nerves ascending; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cymes, flowers, staminal column* and *stigma* as in *G. crassifolius.*

TRIBE 3. CYNANCHEÆ.

17. GLOSSONEMA, *Dcne.*

Diffuse, hoary undershrubs or herbs, branched from the base. *Leaves* opposite. *Cymes* small 2–6-flowered, sessile or shortly peduncled; flowers small. *Sepals* glandular within. *Corolla* subcampanulate, tube short, lobes overlapping to the right. *Corona* near the base of the tube, 5-cleft; lobes large, broad, hyaline, obtuse acuminate or ligulate. *Staminal column* short; anthers tipped by an inflexed membrane; pollen-masses solitary in each cell, oblong, not compressed, pendulous, waxy. *Stigma* exserted, fleshy, conical clavate or peltate. *Follicles* thick, acuminate, muricate or spinous. *Seeds* comose.—DISTRIB. Species 6; tropical African, Arabian and Scind.

G. varians, *Benth. in Gen. Pl.* ii. 748; leaves fleshy ovate or rounded obtuse or acute, margin crisped or entire, upper narrower, cymes subsessile, pedicels very short, corolla-lobes rounded. Mastostigma varians, *Stocks in Hook. Ic. Pl.* t. 843; *Boiss. Fl. Orient.* iv. 51.

SCIND, *Vicary, Frere, Stocks.*—DISTRIB. Beluchistan, Persia.

Annual? *Branches* 4–6 in., stout, erect or decumbent. *Leaves* 1–2 in., often as broad, base acute, nerves obscure; petiole $\frac{1}{4}$–1 in. *Flowers* yellowish, $\frac{1}{6}$ in. diam. *Follicles* 2–3 in., ovoid, turgid, beaked, fleshy; spines very stout, soft, scattered. *Seeds* $\frac{1}{8}$ in., broadly ovate, flattened, pale yellow-red, margins thin.

18. **OXYSTELMA,** *Br.*

Twining glabrous herbs or undershrubs. *Leaves* narrow, opposite. *Flowers* large, in loose racemose or umbelliform cymes or solitary, pedicels filiform. *Calyx* small, 5–∞-glandular within. *Corolla* broadly urceolate, or campanulate or rotate; lobes ciliate and subvalvate below, tips overlapping to the right. *Corona* double, corolline annular, at the base of the corolla, papillose within, margin membranous, truncate; staminal of 5 scales adnate to the bases of the stamens with cordate or dilated bases, 2-keeled within. *Filaments* short, connate; anther-tips membranous, inflexed; pollen-masses one in each cell, oblong, compressed, pendulous, waxy. *Stigma* depressed, or subconvex. *Follicles* thick, oblique or curved, smooth or narrowly 2-winged. *Seeds* comose.—DISTRIB. Species 4; tropical Asia and Africa.

O. esculentum, *Br.*; leaves lanceolate linear-lanceolate or linear finely acuminate, base acute rounded or cordate, corolla 1 in. diam. ciliate, follicles oblong lanceolate or ovoid. *Wight Contrib.* 54; *Grah. Cat. Bomb. Pl.* 121; *Dalz. & Gibs. Bomb. Fl.* 150; *Hook. Comp. Bot. Mag.* t. 22; *Griff. Notul.* iv. 61, and *Ic. Pl. Asiat.* t. 399, 400; *Wall. Cat.* 8219; *Miq. Fl. Ind. Bat.* iii. 483; *Dcne. in DC. Prodr.* viii. 542. O. Wallichii, *Wight Contrib. l. c.*; *Dcne. l. c.*; *Wall. Cat.* 8220. Periploca esculenta, *Linn. f. Suppl.* 168; *Roxb. Cor. Pl.* i. 13, t. 11. Asclepias rosea, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 40, and *As. Research.* iv. 268 (*Doogdhdika*).

Throughout the plains and lower hills of INDIA; from the Punjab to Ceylon, Assam, Pegu and Tenasserim.—DISTRIB. Ava, Java.

A deciduous-leaved very slender climbing perennial. *Leaves* 4–6 by $\frac{1}{8}$–1 in., membranous, nerves many, uniting far within the margin; petiole $\frac{1}{2}$ in., very slender. *Cymes* few-fld., peduncles and pedicels capillary. *Flowers* white and rose-coloured with purple veins. *Follicles* 2–3 in., rather membranous. *Seeds* very numerous, $\frac{1}{8}$ in., broadly ovate, flat.—*O. Wallichii* of Wight differs only in the more oblong follicles rounded at the end.

19. **CALOTROPIS,** *Br.*

Erect, glabrous or hoary shrubs or small trees. *Leaves* opposite, broad, subsessile. *Flowers* medium-sized in umbelliform or subracemose cymes. *Sepals* glandular within. *Corolla* broadly campanulate; lobes broad, naked, valvate. *Coronal-scales* 5, fleshy, laterally compressed, radiating from the large staminal column, dorsally spurred. *Anther-tips* membranous, inflexed; pollen-masses one in each cell, pendulous flattened, waxy. *Stigma* depressed, 5-angled or -lobed. *Follicles* short, thick. *Seeds* comose.—DISTRIB. Species 3; tropical Asia and Africa.

1. **C. gigantea,** *Br. in Hort. Kew. Ed.* 2, ii. 78; sub-arboreous, leaves sessile beneath and umbels cottony, corolla-lobes spreading, coronal-scales truncate hairy. *Hamilt. in Trans. Linn. Soc.* xiv. 245; *Wight Contrib.* 53, and *Ill.* t. 155, 156 A.; *Dalz. & Gibs. Bomb. Fl.* 149; *Grah. Cat. Bomb. Pl.* 120; *Brand. For. Fl.* 331; *Griff. Notul.* iv. 68, and *Ic. Pl. Asiat.* t. 397, 398; *Dcne. in DC. Prodr.* viii. 535; *Bot. Reg.* t. 58. Asclepias gigantea, *Willd.*; *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 30.

Throughout INDIA, ascending to 3000 ft. in the Himalaya from the Punjab to Assam, Ceylon and Singapore.—DISTRIB. Malay Islands, S. China.

Trunk stout, bark pale, shoots woolly. *Leaves* 4–8 by 1–3 in., cuneate-obovate, base cordate, axils bearded, smooth above, cottony beneath. *Umbels* peduncled, simple or compound; bracts oblong. *Corolla* ½–2 in. diam., pale purple; segments ovate-lanceolate, revolute and twisted in age. *Follicles* recurved, 3–4 in. *Seeds* ¼ in., broadly ovate.

2. **C. procera,** *Br. in Ait. Hort. Kew. Ed.* 2, ii. 78; shrubby, leaves sessile young and umbels cottony old glabrous, corolla-lobes erect, coronal-scales acute glabrous or pubescent. *Hamilt. in Trans. Linn. Soc.* xiv. 246; *Wight Contrib.* 53, and *Ic.* t. 1278; *Dalz. & Gibs. Bomb. Fl.* 149; *Brand. For. Fl.* 331; *Boiss. Fl. Orient.* iv. 57; *Bentl. & Trim. Med. Pl.* t. 176; *Dcne. in DC. Prodr.* viii. 585. C. Hamiltoni, *Wall. Cat.* 8215; *Wight l. c.* C. Wallichii, *Wight l. c.* 53; *Wall. Cat.* 8216. C. heterophylla, *Wall. Cat.* 8217; *Wight l. c.* 54. Asclepias procera, *Bot. Reg.* t. 1792.

WESTERN and CENTRAL INDIA, ascending to 3500 ft. from Scind and the Punjab to Behar and Bombay.—DISTRIB. Ava, Persia, trop. Africa.

A shrub 6–15 ft. *Leaves* as in *A. gigantea*, but more oblong and acute, sometimes 8–9 by 4 in. *Umbels* long-peduncled, cottony. *Follicles* 4–5 in., recurved. *Seeds* ¼ in., ovoid.

3. **C. Acia,** *Hamilt. in Trans. Linn. Soc.* xiv. 247; herbaceous, leaves petioled obovate oblanceolate or oblong glabrous, corolla-lobes erect, coronal-scales 2-lobed. C. herbacea, *Wight Contrib.* 54, and *Ic.* t. 492; *Wall. Cat.* 8218; *Dcne. in DC. Prodr.* viii. 536. Asclepias herbacea, *Roxb. Hort. Beng.* 21, and *Fl. Ind.* ii. 50.

N. BENGAL and SIKKIM TERAI; from Tirhoot to Mymensing, ascending the Himalaya to 3000 ft.

Stem erect. *Leaves* 6–8 by 3–4 in., very thick, narrowed into the petiole; nerves few, stout; petiole ¼–1 in.—Flowers as in *C. procera.*

19.* ASCLEPIAS, *Linn.*

Perennial erect herbs. *Leaves* opposite, alternate or whorled. *Cymes* umbelliform; flowers medium-sized or small. *Sepals* glandular within. *Corolla* rotate, lobes often reflexed, naked, valvate. *Coronal-scales* 5, erect, adnate to the column, spoon-shaped. *Anther-tips* membranous, inflexed; pollen-masses one in each cell, pendulous, flattened, waxy. *Stigma* depressed, 5-angled. *Follicles* turgid, beaked, smooth. *Seeds* comose.—DISTRIB. Species 60; all American, except 2 African and the following cosmopolitan one.

A. curassavica, *Linn.*; *Dcne. in DC. Prodr.* viii. 566; perennial, leaves opposite lanceolate or oblong-lanceolate acute narrowed into a short petiole glabrous, umbels many-fld. shortly peduncled, corolla orange-red, lobes reflexed, column stipitate. *Roxb. Hort. Beng.* 20; *Dalz. & Gibs. Bomb. Fl. Suppl.* 54; *Gibs. Cat. Bomb. Pl.* 120; *Bot. Reg.* t. 81.

Bengal and various parts of India, a weed introduced from the West Indies throughout the tropics.

20. PENTABOTHRA, *Hook. f. Gen. Nov.*

A dwarf erect glabrous herb. *Leaves* opposite, linear. *Flowers* in axillary umbelliform short-peduncled cymes. *Sepals* oblong, minutely glandular within. *Corolla* campanulate, deeply 5-lobed; lobes oblong-ovate, overlapping to the

right. *Corona* of 5 pouch-like folds at the base of the column alternating with the anthers, and 5 fleshy laterally compressed processes with free obtuse tips adnate longitudinally to the backs of the anthers. *Anthers* large, horny, membranous tips large oblong; pollen-masses one in each cell, elongate, compressed, falcate, with long pedicels, pendulous, waxy. *Stigma*, a depressed 5-angled cone, included.

P. nana, *Hook. f. Ic. Pl.* 1426. Cynanchum nanum, *Ham. in Wight Contrib.* 59; *Wall. Cat.* 8230.

NORTHERN CAMRUP (Lower Assam), at Sanyashikata, in grassy hills, *Hamilton*.

Stem 5–6 in., rigid, divided below. *Leaves* 4 by $\frac{1}{4}$–$\frac{1}{2}$ in., spreading, exactly linear, acute, base cordate, midrib stout, nerves faint; petiole $\frac{1}{10}$ in. *Umbels* clustered, many-fld.; pedicels $\frac{1}{4}$ in.; bracts lanceolate. *Sepals* puberulous. *Corolla* $\frac{1}{5}$–$\frac{1}{4}$ in. diam., purple within, glabrous.—A very remarkable plant, of which the specimen in Wallich's Herbarium (from which fragments were sent to Wight) is the only one known. It is evidently near *Holostemma* and *Asclepias* itself.

21. RAPHISTEMMA, *Wall.*

Twining glabrous shrubs. *Leaves* opposite, membranous. *Cymes* axillary, umbelliform, long-peduncled; flowers large, white, long-pedicelled. *Calyx* 5-glandular within. *Corolla* campanulate, 5-fid; lobes spreading, twisted in bud and overlapping to the right. *Coronal-scales* 5, membranous, adnate to the column, produced into long slender linear ligules. *Column* large, anthers with an inflexed membranous tip; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* depressed, flat, 2-lobed in the middle. *Follicles* thick, acute, smooth. *Seeds* comose. DISTRIB. Species 2; Asiatic.

1. **R. pulchellum,** *Wall. Pl. As. Rar.* ii. 50, t. 163, and *Cat.* 8221 A.; leaves cordate acuminate, flowers 1–1½ in. long. *Wight Contrib.* 55. *Dcne. in DC. Prodr.* viii. 516. *Paxt. Fl. Gard.* iii. t. 101; *Paxt. Mag.* xiv. 27 with fig.; *Fl. des Serres*, t. 223. Asclepias pulchella, *Roxb. Fl. Ind.* ii. 54.

SIKKIM HIMALAYA, alt. 2000 ft., *J.D.H.* ASSAM, SILHET and CACHAR, *Hamilton*, &c. PEGU, *Wallich*. MOULMEIN, *Parish*.

Branches slender, smooth, herbaceous. *Leaves* 3–7 in., sinus at base wide, midrib glandular at the base above; petiole 2–5 in. *Cymes* 4–6 fld.; peduncle 4–5 in.; pedicels very slender, 1½–2 in. *Sepals* broad, very variable in size. *Corolla* thick, pure white. *Follicles* (from a drawing) solitary? 6 by 1½ in. diam., sharply deflexed from the very base, fusiform, turgid, terete, green, slightly upcurved.—Wallich's 8221 B. from Finlayson seems to be *R. Hooperianum*, a native of Java and Siam.

22. PENTATROPIS, *Br.*

Twining slender herbs or undershrubs. *Leaves* opposite, small. *Cymes* umbelliform, axillary; pedicels slender. *Flowers* small, purplish. *Calyx* 5-partite. *Corolla* rotate, 5-fid; lobes elongate, overlapping to the right, twisted to the left. *Corona* of 5 laterally compressed scales adnate vertically to the backs of the anthers with free tips and spurred bases. *Column* short; anther-tips inflexed; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* hardly umbonate. *Follicles* smooth. *Seeds* comose. DISTRIB. Species 8; tropical Asiatic, African, and Australian.

1. **P. spiralis,** *Dcne. in Ann. Sc. Nat.* 1838, 327, t. 11 E. and in *DC. Prodr.* viii. 536; glabrous, leaves ovate lanceolate or oblong base rounded or cordate, corolla-lobes ovate-lanceolate elongate caudate. *Edgew. in Journ. Linn. Soc.* vi. 204, t. 1, f. 9; *Boiss. Fl. Orient.* iv. 58. P. microphylla, *Wall. Cat.*

8213 D. Oxystelma? caudatum, *Herb. Ham.* Asclepias spiralis, *Forsk. Fl. Eg. Arab.* 49.

The PANJAB, SCIND, and Eastwards to the Jumna river. DISTRIB. Affghanistan and Westwards to the Red Sea and Nubia.

Leaves 1–1½ in., very variable in breadth, obtuse or acute, usually apiculate, coriaceous, nerves obscure; petiole ⅛–⅓ in. *Peduncles* very short or 0; pedicels capillary, top obconic. *Calyx* minute. *Corolla* green, ½ in. diam.; segments narrowed from a triangular base. *Follicles* 2½–3 in., fusiform, narrowed to the base and to the long straight rather slender point. *Seeds* ¼ in. long, ovate, flat, broader end crenate.

2. **P. microphylla,** *Wight & Arn. Contrib.* 52; glabrous, leaves oblong ovate or rounded, base rounded or cordate, corolla-segments triangular-lanceolate obtuse. *Wight Ic.* t. 352; *Wall. Cat.* 8213, *excl. D.*; *Dalz. & Gibs. Bomb. Fl.* 149; *Grah. Cat. Bomb. Pl.* 120; *Dcne. in DC. Prodr.* viii. 536. Asclepias microphylla, *Roxb. Fl. Ind.* ii. 35; *Roth Nov. sp.* 177? Cynanchum acuminatum, *Thunb. Obs. in Cynanch.* 5; *Dcne. l.c.* 548. Eutropis, gen. nov. *Falconer in Proc. Linn. Soc.* i. 15.

BENGAL, in the Sunderbunds; PEGU; DECCAN PENINSULA, from Bombay southwards. CEYLON, not uncommon.

Habit and general characters of *P. spiralis*, but the flowers are much smaller, and the corolla-lobes have not the long tails.

23. DÆMIA, *Br.*

Twining pubescent or tomentose undershrubs. *Leaves* opposite, cordate. *Cymes* axillary, racemiform or corymbiform, pedicels filiform. *Sepals* glandular within. *Corolla* greenish-white, tube short infundibular; lobes large, broadly ovate, spreading, overlapping to the right. *Corona* of an outer annular 5–10-crenate or -lobed membrane, and 5 laterally compressed scales vertically adnate to the anthers and spurred behind, with free long subulate tips. *Column* large, anther-tips inflexed; pollen-masses one in each cell, subcompressed, pendulous, waxy. *Follicles* echinate. *Seeds* comose.—DISTRIB. Species 6; Asiatic and African.

D. extensa, *Br. in Mem. Wern. Soc.* i. 50; subhispidly hairy or glabrate, leaves membranous broadly ovate acuminate deeply cordate pubescent beneath, lobes rounded incurved, peduncles long racemose, corolla ciliate, follicles clothed with long soft spines. *Wight Contrib.* 59, and *Ic.* t. 596; *Wall. Cat.* 8231, *excl. F.*; *Dalz. & Gibs. Bomb. Fl.* 150; *Grah. Cat. Bomb. Pl.* 122; *Dcne. in DC. Prodr.* viii. 544. Cynanchum extensum, *Ait.*; *Jacq. Ic. Rar.* t. 54. C. cordifolium, *Retz. Obs.* ii. 15. C. echinatum, *Thunb. Obs. in Cynanch.* 8; *Dcne. l.c.* 549. Asclepias echinata, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 44. Raphistemma ciliatum, *Hook. f.* in *Bot. Mag.* t. 5704.

Throughout India; from the Salt range and the N.W. HIMALAYA (ascending to 3000 ft.) to LOWER BENGAL and CEYLON (not seen from the Malay Peninsula, Birma, or Pegu).—DISTRIB. Affghanistan.

A fœtid climber, hairs on stem spreading. *Leaves* 2–4 in. long and broad; petiole 2–4 in. *Peduncles* 2–6 in.; pedicels capillary, ½–2 in. *Sepals* small, ovate, pubescent. *Corolla* ⅜ in. diam., pale yellowish green and red. *Column* large, tips of inner coronal processes often twisted together. *Follicles* 1½–2 in., lanceolate, beaked. *Seeds* ¼ in. long, broadly ovate, pubescent, margin quite entire.

24. ADELOSTEMMA, *Hook f. Gen. Nov.*

A slender glabrous twiner. *Leaves* opposite, long-petioled, cordate. *Flowers* small, in axillary peduncled corymbiform cymes. *Sepals* lanceolate. *Corolla*

campanulate, glabrous, shortly 5-lobed; lobes erecto-patent, overlapping to the right. *Corona* 0. *Column* very shortly stipitate, conical, 5-angled; anthers with very long oblong membranous tips; pollen-masses one in each cell, ovoid, pedicelled, waxy, corpuscles large. *Stigma* clavate, tip exserted, obtuse.

10656 1. **A. gracillimum,** *Hook. f. Ic. Pl.* t. 1427. Cynanchum gracillimum, *Wall. in Wight Contrib.* 57.

BURMA; at Segaen, *Wallich.*

Leaves in distant pairs, $1\frac{1}{2}$–$2\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., very membranous, acuminate; basal lobes rounded, incurved with a broad sinus; nerves very slender; petiole 1–$1\frac{1}{2}$ in. filiform. *Cymes* puberulous; peduncles shorter than the petioles, pedicels $\frac{1}{10}$–$\frac{1}{4}$ in. *Sepals* half as long as the corolla, which is $\frac{1}{6}$ in. long, pale and quite glabrous inside and out.—I find no traces of the 5-fid tubular corona at the base of the stipes of the column described by Wight.

25. **HOLOSTEMMA,** *Br.*

Twining glabrous shrubs. *Leaves* opposite, membranous, cordate. *Cymes* axillary, few-fld.; flowers large, purple. *Sepals* eglandular. *Corolla* subrotate; lobes thick, ovate, overlapping to the right. *Corona* low, annular, 10-lobed, fleshy. *Anthers* very large, oblong, horny, shining, cohering in a 10-winged column, tip small inflexed membranous; pollen-masses one in each cell, elongate, falcate, compressed, pendulous, waxy, pedicels long black. *Stigma* included, 5-winged. *Follicles* short, thick, smooth, acute. *Seeds* comose.—DISTRIB. Two Indian species.

H. Rheedei, *Wall. Pl. As. rar.* ii. 51, and *Cat.* 4469; leaves acuminate basal lobes rounded, flowers subglobose red-purple and white. *Wight Contrib.* 55, and *Ic.* t. 597; *Dcne. in DC. Prodr.* viii. 532. H. fragrans, *Wall. l. c.*; *Dcne. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 148; *Grah. Cat. Bomb. Pl.* 121. H. Brunonianum, *Royle Ill.* 276. t. 66; *Dcne. l. c.* 533. H. Adakodien, *Roem. & Sch. Syst.* vi. 95. Asclepias annularis, *Roxb. Fl. Ind.* ii. 37. Sarcostemma annulare, *Roth Nov. sp.* 178. Gomphocarpus volubilis, *Herb. Ham.* (*in Wight l. c.*)—*Rheede Hort. Mal.* ix. t. 7.

TROPICAL HIMALAYA, from Sirmore to Sikkim, alt. 3–5000 ft. DECCAN PENINSULA, from the Circars and Canara southwards. PEGU and BIRMA.

Quite glabrous, or the leaves faintly puberulous. *Leaves* 3–6 in., basal lobes spreading or incurved and meeting; petiole 1–3 in., glandular at the base of the midrib above. *Cymes* umbelliform or in irregular racemes; peduncles 1–2 in.; pedicels as long. *Corolla* 1–$1\frac{1}{2}$ in. diam.; lobes subacute, incurved, white on the back and margin. *Follicles*, according to Rheede's figure, like those of *Raphistemma.*—Sprengel is given as the authority for the name *H. Rheedei*, on the supposition that it is his *H. Rheedianum*, which being described as erect with oblong cuspidate strongly nerved leaves must be a very different plant. As Sprengel's other species, *H. Candolleana*, is a *Fischeria*, his genus must be abandoned.

26. **CYNANCHUM,** *Linn.*

Erect or twining herbs or shrubs. *Leaves* opposite, rarely whorled. *Cymes* axillary, umbelliform racemose or subpaniculate; flowers small, greenish or purplish. *Calyx* 5-partite. *Corolla* rotate, 5-partite, lobes overlapping to the right or valvate. *Corona* adnate to the base of the column, 5-partite or cupular or campanulate, variously toothed or lobed, with or without scales or tubercles on the inner face opposite the lobes. *Anthers* sessile or stipitate, tip membranous inflexed; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* flat, umbonate or apiculate. *Follicles* terete or shortly 2-winged, elon-

gate, moderately ventricose, smooth (in *C. corymbosum* densely clothed with soft spines). *Seeds* comose.—DISTRIB. Species about 100; tropical and temperate.

I cannot retain *Vincetoxicum* as distinct from *Cynanchum*; the presence or absence of processes or scales within the corona affords no character (see *C. acutum*). The corona itself affords very inconstant characters even for many of the species.

* Stem erect. Corona simple, 5-lobed or -partite, lobes without internal processes.

1. **C. Vincetoxicum,** *Pers.*; pubescent or glabrate, leaves broadly cordate or ovate acute, cymes sessile or peduncled, flowers corymbose or paniculate, corolla yellow, segments glabrous or nearly so, coronal-lobes triangular oblong or rounded. C. Kenouriense, *Wight Contrib.* 58. Vincetoxicum officinale, *Moench*; *Boiss. Fl. Orient.* iv. 54; *Dcne. in DC. Prodr.* viii. 524. V. Kenouriense, *Dcne. l.c.* 525. Asclepias Vincetoxicum, *Linn.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–11,000 ft.—DISTRIB. Westwards to Norway and Spain.

Stem 6–10 in., and leaves beneath usually pubescent, sometimes glabrous; leaves broader, greener, shorter petioled and less coriaceous than in the two following species. The coronal-lobes are very variable indeed.

2. **C. glaucum,** *Wall. in Wight Contrib.* 58; erect, hoary or puberulous pale or glaucous, leaves ovate oblong lanceolate or cordate, cymes usually sessile, flowers umbelled, corolla yellow segments hirsute or bearded within, coronal-lobes 5 rounded broader than long fleshy. *Wall. Cat.* 8229. Vincetoxicum canescens, *Dcne. in DC. Prodr.* viii. 523; *Boiss. Fl. Orient.* iv. 52.

TEMPERATE HIMALAYA, from Nepal Westwards, alt. 5–9000 ft. WESTERN TIBET, alt. 10–12,000 ft.—DISTRIB. Afghanistan and westward to the Greek Archipelago.

Stem 6–18 in., erect, flexuous; rootstock with dense fascicles of roots as in *C. Vincetoxicum*. *Leaves* 1–3 by 1½–2½ in., extremely variable in length and breadth, coriaceous, acute acuminate or apiculate, nerves very oblique; petiole ¼–½ in. *Cymes* pubescent, few or many-fld.; pedicels short. *Corolla* ⅙ in. diam., very variable in size, segments subacute. *Coronal-lobes* variable. *Follicles* 2–4 in., slender. *Seeds* ¼–⅓ in. long, broadly ovoid, concavo-convex.—Boissier says that *C. glaucum* differs from *canescens* in the narrower leaves, few-fld. cymes, and smaller corolla with ovate segments, but none of these characters hold good. In some Tibetan specimens the coronal-lobes are narrow, and the filaments form a rather long column.

3. **C. Arnottianum,** *Wight Contrib.* 58; erect, puberulous or hoary, leaves ovate oblong or lanceolate, cymes sessile, corolla dark purple, segments hirsute or bearded within, coronal-lobes 5 fleshy oblong or rounded. Vincetoxicum Arnottianum, *Wight Ic.* t. 1614; *Dcne. in DC. Prodr.* viii. 523; *Boiss. Fl. Orient.* iv. 52. V. montanum, *Dcne. l. c.* 525. V. luridum. *Stocks mss.*

WESTERN HIMALAYA; Kashmir, alt. 6–8000 ft., *Royle*, &c.—DISTRIB. Beluchistan.

Habit and foliage of *C. glaucum*, with the leaves sometimes whorled, and smaller dark purple flowers. I suspect that it is only a variety of that plant, and both of *C. Vincetoxicum.*

** Stem twining. Corolla glabrous. Corona without internal processes.

† *Peduncle of cyme short.*

4. **C. ovalifolium,** *Wight Contrib.* 57; twining, glabrous, leaves elliptic or oblong acuminate base rounded or subacute, peduncles short, flowers racemose or panicled, corona short irregularly toothed, teeth often curved.

Wall. Cat. 8226. Cynoctonum ovalifolium and C. Blumei, *Dcne. in DC. Prodr.* viii. 529, 528. Holostemma læve, *Blume Bijd.* 1055.

PENANG, *Wallich*; MALACCA, *Maingay.*—DISTRIB. Java.

Leaves 3–4 by 1½ in., coriaceous, pale beneath, nerves spreading; petiole ½–¾ in. *Sepals* ovate. *Corolla* ¼ in. diam.; segments broadly ovate, quite glabrous. *Column* sessile. *Follicles* 5 in. long, thickly coriaceous, terete, tapering to a narrow but stout point, tip recurved. *Seeds* ⅓ in., very broad and flat.—"Produces an excellent caoutchouc" (Wallich). Making allowance for the variability of the corona in this genus, I am disposed to unite with this the *C. formosanum*, Maxim. (*Diagn. Pl. Nov. Asiat.* 801), and Cuming's No. 774 from the Philippines.

5. **C. alatum,** *Wight & Arn. Contrib.* 56; twining, puberulous or glabrate, leaves linear ovate or oblong acute base contracted cordate pale beneath, umbels shortly peduncled pubescent, corona short cupular plaited irregularly crenate, follicles narrowly 2-winged. Cynoctonum alatum, *Dcne. in DC. Prodr.* viii. 529; *Wight Ic.* t. 1280.

NILGHERRY MTS., *Gardner*, &c. TRAVANCORE, at Coimbatore, *Wight*.

Stem slender, sometimes softly pubescent. *Leaves* 1½–2½ in., rarely more, very variable in breadth, glabrous or puberulous above; basal lobes rounded, sinus open or almost closed; petiole ½–⅔ in. *Umbels* 1 in. diam., peduncle and pedicels pubescent. *Calyx* lobes ovate. *Corolla* ¼ in. diam., glabrous, segments oblong-ovate. *Follicles* 2–2½ in., dorsally compressed.—Wight's figure represents the whole plant as far too hairy; he gives Coimbatore as the only habitat, but his specimens are marked from the Nilgherries, as are all the others I have seen (Gardner, Hohenacker, Schmidt, G. Thomson). In the "Contributions" he gives Coromandel as the only native country, which is unlikely. The plaited corona has obscure thickenings on some of the folds of the inner face which are rudimentary inner processes.

6. **C. pauciflorum,** *Br. in Mem. Wern. Soc.* i. 45; twining, nearly glabrous, leaves ovate or ovate-lanceolate acuminate, base broadly cordate, lobes rounded, umbels shortly peduncled and flowers glabrous, corona much longer than the sessile column 5-lobed with 5 intermediate teeth, follicles terete. *Wight Contrib.* 56; *Ic.* t. 354; *Wall. Cat.* 8223; *Dalz. & Gibs. Bomb. Fl.* 148? C. inconspicuum, *Griff. Notul.* iv. 66, and *Ic. Pl. Asiat.* t. 401. Cynoctonum pauciflorum, *Dcne. in DC. Prodr.* viii. 528. Periploca tunicata, *Retz. Obs.* ii. 15; *Willd. Phytogr.* i. 7, t. 5, f. 3. Asclepias tunicata, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 35.

DECCAN PENINSULA; from the Concan southwards to Travancore. CEYLON, very common in the Central Province.

Stem slender. *Leaves* 2–2½ by 1–1½ in., broadest at the base, rather coriaceous; petiole ½–1 in., glabrous or puberulous; stipular leaves rounded, ¼ in. diam. or less. *Peduncle* shorter than the petiole. *Flowers* ¼ in. diam. *Sepals* lanceolate. *Corona* nearly equalling the corolla, campanulate, plicate, large lobes sometimes 2-fid at the tip. *Follicles* 2½ in. long, thinly coriaceous, beak slender. *Seeds* orbicular, flat, ¼ in. diam.—This at first sight resembles *C. alatum*, but the leaves broad at the base at once distinguish it. The name *pauciflorum* is not very distinctive.

7. **C. Wallichii,** *Wight Contrib.* 56; twining, glabrous, leaves ovate- or oblong-lanceolate finely acuminate membranous base deeply cordate with rounded decurved or incurved lobes, umbels shortly peduncled and flowers glabrous, corona campanulate plicate shortly 5–6-lobed lobes toothed. *Wall. Cat.* 8224. Cynoctonum Wallichii, *Dcne. in DC. Prodr.* viii. 528.

KHASIA and JYNTEA MTS.; at the foot of the hills, *Wallich*, &c.

Stems slender. *Leaves* 3–5 by 1–2 in., pale beneath, nerves very oblique, basal sinus rounded, open or almost closed by the incurved lobes; petiole 1–1½ in. *Peduncles* much shorter than the petioles, pedicels slender. *Sepals* ovate. *Corolla*

greenish; segments oblong-lanceolate, longer than the corona, which is membranous and pale. *Filaments* forming a column longer than the anthers.

8. **C. Callialata,** *Ham. in Wight Contrib.* 56; twining, glabrous or very sparsely hairy, leaves coriaceous from rounded or oblong or ovate to linear acuminate glaucous beneath, base contracted cordate, nerves spreading obscure, umbels shortly peduncled nearly glabrous flowers glabrous, corona short cupular irregularly 5-toothed and crenate, follicles 2-winged. *Wall. Cat.* 8225; *Wight Ic.* t. 1279. C. auriculatum, *Herb. Ham.* C. angustifolium, *Wight & A. l. c.* 57. Cynoctonum Callialata and angustifolium, *Dcne. in DC. Prodr.* viii. 528, 529. Periploca tunicata, *Herb. Madr.*

Behar; summit of Parusnath, *J. D. H.*, &c. Deccan Peninsula, from the Concan to Travancore. Burma at Hengadah, *Wallich.*

Stem robust, glabrous or sparingly hairy. *Leaves* 3–5 in., very variable in breadth, basal lobes small rounded, sinus narrow, midrib broad, nerves very slender spreading; petiole ½–1 in. *Peduncles* shorter than the petioles. *Flowers* ⅓ in. diam., quite glabrous *Corona* follicles and seeds as in *C. alatum.*—Very closely allied to *C. alatum*, but quite distinct in the much larger size and glabrous habit.

†† *Peduncles of cyme long, slender.*

9. **C. corymbosum,** *Wight Contrib.* 56; quite glabrous, leaves ovate- or orbicular-cordate cuspidate or acuminate membranous glaucous beneath, basal lobes rounded decurved or incurved, peduncles long equalling the long petioles, corona campanulate plicate with longitudinal thickenings within, mouth irregularly crenate, anthers sessile, follicles large clothed densely with long fleshy spines. *Wall. Cat.* 8222, 8231, *F.* Cynoctonum corymbosum, *Dcne. in DC. Prodr.* viii. 528.

Sikkim Himalaya, alt. 2–4000 ft. *Clarke.* Khasia Mts., Silhet and Cachar, alt. 1–3000 ft. *Wallich,* &c. Penang, *Wallich.* Nicobar Islds. *Kurz.*

Stem rather stout. *Leaves* 2–6 by 1–3 in., membranous, white beneath; petiole 1½–3 in. *Peduncle* slender; flowers racemose or corymbose, ⅓–½ in. diam. quite glabrous. *Sepals* ovate, obtuse. *Corolla-segments* obtuse. *Corona* large, much longer than the short column, with internal thickenings as in *C. alatum. Seeds* ½ in. long, orbicular-ovoid, with a wrinkled nucleus surrounded by a very broad wing deeply crenate at the lower end.—The large lanceolate almost fleshy follicles, 4–5 by 1–1½ in. diam., densely clothed with soft reversed hooked spines ⅓–½ in. long, are quite peculiar, and recall those of *Dæmia.* It is remarkable that this species, though collected both in the Nicobar Islands and Penang, should never have been found in Burma or the Malay Peninsula.

10. **C. deltoideum,** *Hook. f.*; twining, glabrous or nearly so, leaves deltoid-cordate acuminate membranous, peduncles slender, flowers small umbelled glabrous, corona 10-lobed to the middle, 5 lobes large ovate obtuse, 5 intermediate very small rounded.

Khasia Mts.; Kalapanee and Moflong, alt. 5–6000 ft., *J. D. H. & T. T.*

Stem slender. *Leaves* 2–3 in. long and nearly as broad, pale beneath, basal lobes large rounded, sinus broad; petiole 1–1½ in. *Umbels* many-fld.; peduncle longer than the petiole, and pedicels hairy. *Sepals* ovate, glabrous. *Corona* concealing the sessile column, the large lobes elliptic and thickened, smaller membranous.

*** Stem twining or suberect. Corolla glabrous or pubescent. Corona with processes on its inner face (sometimes absent in *C. acutum*).

† *Corolla glabrous within.*

11. **C. acutum,** *Linn.; Boiss. Fl. Orient.* iv. 60; twining, glabrous or nearly so, leaves narrowed from a broad 3-lobed or hastately cordate base

linear or lanceolate acuminate, peduncle long or short, flowers umbelled or corymbose, corolla glabrous, corona variable, follicles long flattened, seeds narrowly oblong. *Dcne. in DC. Prodr.* viii. 547. C. longifolium, *Martens*; *Dcne. l. c.*

WESTERN TIBET, alt. 11–13000 ft., *Thomson* &c.—DISTRIB. Afghanistan, Central and Western Asia. Mediterranean region to Spain.

Leaves 1–5 in. long, very variable in width and in the size and spread of the basal lobes which are rounded at the tip and sometimes $1\frac{1}{2}$ in. long; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Peduncle* equalling or exceeding the petiole, pedicels pubescent. *Sepals* ovate, usually pubescent. *Corolla* $\frac{1}{4}$–$\frac{3}{4}$ in. diam.; segments ovate-oblong. *Corona* sometimes quite simple and cleft deeply into triangular lanceolate erect or spreading simple lobes, sometimes cupular and 5-lobed or with 2–5 subulate lobes, and furnished within with a tongue-shaped process. *Anthers* sessile, or stalked by the column of filaments. *Follicles* quite unlike those of its congeners, 4–6 in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., thinly coriaceous, straight or slightly curved, somewhat compressed, hardly turgid, narrowed to a slender point. *Seeds* $\frac{1}{4}$ in. long flat.

3470 12. **C. Heydei,** *Hook. f.*; twining, nearly glabrous, leaves lanceolate acuminate deeply cordate the lobes incurved often overlapping, sinus long narrow, peduncle slender, flowers corymbose, corolla glabrous, corona campanulate, mouth with 5 long subulate exserted processes each with a short process at its inner base.

WESTERN TIBET; Ladak, between Saspo and Kala-tse, *Heyde.*

I have seen only Heyde's specimens, which differ entirely from *C. acutum* in the long incurved basal lobes of the leaf and the long teeth of the corona projecting beyond the corolla.

13. **C. Dalhousiæ,** *Wight Contrib.* 55; twining, nearly glabrous, leaves elongate linear-lanceolate acuminate base cordate, lobes rounded, peduncles short, flowers umbelled quite glabrous, corona campanulate 5–10-lobed with a low conical process opposite to each lobe near the base within. *Dcne. in DC. Prodr.* viii. 548.

WESTERN TEMPERATE HIMALAYA, from Sirmore to Kumaon, alt. 5–7000 ft.

Stem slender, with sometimes a line of hairs. *Leaves* 3–7 by $\frac{1}{2}$–1 in., membranous, basal lobes short rounded pointing backwards, sinus open, nerves very oblique; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Peduncles* shorter than the petioles; pedicels slender, glabrous or puberulous. *Flowers* $\frac{1}{3}$ in. diam., pale green. *Sepals* ovate. *Corona* equalling the corolla.

†† *Corolla pubescent within.*

14. **C. auriculatum,** *Herb. Royle*; *Wight Contrib.* 58; twining, puberulous, leaves broadly ovate to ovate-lanceolate acuminate deeply cordate membranous, basal lobes incurved rounded, peduncles long, flowers corymbose, corolla pubescent within, corona short cupular deeply 5-lobed, lobes oblong obtuse with adnate fleshy processes on their inner faces. Endotropis auriculata, *Dcne. in DC. Prodr.* viii. 546.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6–12000 ft.

Leaves usually large, 4–6 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., very membranous, basal lobes sometimes meeting or overlapping; petiole 1–2 in. *Peduncles* 2–4 in., often stout; pedicels slender; flowers numerous, yellow, $\frac{1}{3}$–$\frac{3}{4}$ in. diam. *Sepals* lanceolate. *Corolla-segments* linear-oblong or lanceolate. *Follicles* 4 by $\frac{1}{2}$ in., straight. *Seeds* $\frac{1}{4}$ in. long, flat, flask-shaped with a crenulate broader end.—Nearly allied to *C. Wilfordi*, Maxim. 3613
(E. caudata, *Miquel*; Symphyoglossum hastatum, *Turczan. in Bull. Soc. Imp. Nat. Mosc.* 1848, i. 255), of China and Japan, which has smaller flowers.

15. **C. Roylei,** *Wight Contrib.* 58; suberect, softly pubescent, leaves

small deltoid-ovate or -lanceolate from a broadly cordate base, finely acuminate, sinus open, peduncles very long, flowers corymbose, corolla pubescent, corona short 5-lobed lobes rounded with a tubercle on their inner faces. Endotropis Roylei, *Dcne. in DC. Prodr.* viii. 547.

WESTERN HIMALAYA; Kunawur, *Royle, Jacquemont*, &c.

A span to a foot high, branches flexuous. *Leaves* 1–1½ in., pubescent on both surfaces; petiole ¼–½ in. *Peduncles* sometimes twice as long as the leaves, pedicels slender; flowers numerous, ⅓–½ in. diam. *Sepals* lanceolate. *Corolla* pubescent within and without. *Follicles* 2 in. long, fusiform, turgid, puberulous. *Seeds* ¼ in. long, orbicular-obovate, flat.

16. **C. Jacquemontianum**, *Dcne. in Jacquem. Voy. Bot.* 106, t. 112; nearly glabrous, suberect, much branched, leaves small lanceolate from a broadly cordate base finely acuminate, sinus open, peduncles very long, flowers corymbose, corolla pubescent within only, corona equalling the corolla 5-cleft, lobes subulate-lanceolate entire or cleft with a small flat process below them. C. humile, *Herb. Falconer.* Endotropis Jacquemontii, *Dcne. in DC. Prodr.* viii. 547.

WESTERN HIMALAYA; Kashmir, *Falconer, Jacquemont.*

A span to 2 ft. high. *Branches* slender, spreading, or erect from a woody stock. *Leaves* 1–1½ by ½–⅔ in., sometimes faintly puberulous; petiole ¼–⅓ in. *Peduncles* sometimes twice as long as the leaves; pedicels slender; flowers numerous, ¼–⅓ in. diam. *Sepals* ovate.

DOUBTFUL SPECIES.

C. HEYNEANA, *Roem. & Sch. Syst.* vi. 101; *Dcne. in DC. Prodr.* viii. 549. Periploca reticulata, *Roth. mss.*—May be *C. Callialata.*

C. PEDUNCULATUM, *Thunb. Obs. in Cynanch.* 5; *Dcne. in DC. Prodr.* viii. 548, from Ceylon is undeterminable.

C. TOMENTOSUM, *Lamk.*, is probably *Tylophora asthmatica*, according to Wight (*Contrib.* 51, in note).

27. SARCOSTEMMA, *Br.*

Trailing leafless jointed shrubs with pendulous branches. *Cymes* terminal or at the nodes, umbelliform; peduncle clavate. *Flowers* small. *Calyx* 5-fid. *Corolla* rotate, 5-fid; lobes broad, overlapping to the right. *Corona* cup-shaped, membranous, adnate to the base of the column, 10-crenate or -lobed, the lobes opposite the stamens bearing large fleshy processes which are adnate to the backs of the anthers. *Column* short; anther-tip inflexed; pollen-masses one in each cell, pendulous, slender, waxy. *Stigma* conical or shortly fusiform. *Follicles* smooth. *Seeds* comose.—DISTRIB. Species 5 or 6; Asiatic, African, and Australian.

I am unable to determine the described species of this genus from dried specimens. There are probably differences in the fruit and seeds between the four supposed Indian ones, but I have no sufficient materials to verify this, and those may be reduced to two.

1. **S. brevistigma,** *Wight & Arn. Contrib.* 59; umbels terminal, flowers whitish, column very short, inner processes of the corona almost concealing the anthers, stigma very shortly conical, follicles slightly diverging thinly coriaceous narrowed to the base. *Wight Ic.* t. 595; ? *Wall. Cat.* 8233; *Dalz. & Gibs. Bomb. Fl.* 149; *Dcne. in DC. Prodr.* viii. 538, and in *Jacquem. Voy. Bot.* 107, t. 113. Asclepias acida, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 31. A. aphylla, *Roxb. mss.*

DECCAN PENINSULA; not uncommon in dry rocky places. BURMA, *Wallich.*

Stem as thick as a goose-quill, green; joints 4–6 in. long. *Umbels* sessile, 1–1½ in. diam., many-fld.; pedicels ½ in., puberulous. *Sepals* small, ovate. *Corolla* ⅓ in. diam., pale greenish-white; lobes ovate or oblong, obtuse. *Corona* and *column* together rounded, very obtuse. *Follicles* 4–5 by ⅓ in., thinly coriaceous, tip fine straight. *Seeds* flattened, ⅙–¼ in. long, ovate.

2. **S. Brunonianum,** *Wight & Arn. Contrib.* 59; umbels chiefly lateral, flowers yellow, column very short, inner processes of corona almost concealing the anthers, stigma very shortly conical, follicles as in *S. brevistigma. Wight Ic.* t. 1282; *Dcne. in DC. Prodr.* viii. 538; *Bot. Mag.* t. 6002.

DECCAN PENINSULA, ascending to 4000 ft. in the Nilgherries. CEYLON.

Apparently more slender than *S. brevistigma,* with smaller, chiefly lateral, umbels of bright yellow flowers.

3. **S. intermedium,** *Dcne. in DC. Prodr.* viii. 538; umbels terminal and axillary, flowers white, column ovoid, inner processes of corona oblong subacute, stigma fusiform simple or 2-fid, follicles broad at the base narrowed to the tip thinly coriaceous. S. viminale, *Wight & Arn. Contrib.* 59; *Wight Ic.* t. 1281; ? *Wall. Cat.* 8232, *not of Brown.*

DECCAN PENINSULA, in arid jungles.

The elongate column, narrower dorsal processes of the anthers and longer stigma are the characters of this. The follicles when in pairs spread but do not divaricate as in the following.

4. **S. Stocksii,** *Hook. f.*; umbels terminal, column very short, inner processes of corona almost concealing the anthers, stigma very shortly conical, follicles short spreading horizontally poinard-shaped nearly cylindric subacute hard thickly coriaceous. S. brachystigma (by error for *brevistigma*), *Hook. Ic. Pl.* t. 861.

SCIND, *Stocks.*

Apparently a much more robust plant than any of the preceding, with the flowers of *S. brevistigma,* but widely different follicles, which are 2½–3½ in. long, rigid, almost woody, cylindric but tapering very gradually from the base to the straight stout point; peduncle very short and thick; the seeds are nearly ⅓ in. long, linear-oblong, thicker than in its congeners.

TRIBE 4. **MARSDENIEÆ.**

28. **SARCOLOBUS,** *Br.*

Twining glabrous shrubs. *Leaves* opposite. *Flowers* small, crowded in axillary corymbiform cymes. *Calyx* 5-partite. *Corolla* sub-campanulate; lobes 5, ovate, overlapping to the right. *Corona* 0. *Column* very short; anthers broad, tip inflexed; pollen-masses one in each cell, erect, waxy, elongate, with long twisted pedicels. *Stigma* flat. *Follicles* thick, fleshy, globose and smooth, or oblong and 2-keeled. *Seeds* large, coma 0.—DISTRIB. Species 2–3; Malayan and E. Asiatic.

1. **S. globosus,** *Wall. in Asiat. Research.* xii. 568, t. 4, and *Cat.* 4468; leaves 3–4 in. oblong or ovate acuminate or obtuse and apiculate, corolla-lobes pubescent within, fruit large globose. *Wight Contrib.* 47, and *Ic.* t. 1273; *Dcne. in DC. Prodr.* viii. 625. S. carinatus, *Griff. Notul.* iv. 53, and in *Ic. Pl. Asiat.* t. 410 (*not of Wall.*).

SUNDERBUNDS and eastwards to MERGUI, MALACCA and the NICOBAR ISLANDS.

Branches stout. *Leaves* brown when dry, thinly coriaceous, nerves arched, base usually rounded; petiole ½–1 in., slender. *Peduncles* and *pedicels* very short. *Sepals* oblong, obtuse. *Corolla* ⅓–½ in. diam., pale purple within, lobes obtuse. *Anthers* very broad, shortly stipitate. *Fruit* globose, 4 in. diam.; pericarp very thick, brown. *Seeds* ⅔ in. long, broadly ovate, flat with a thick raised border, dark brown.

2. **S. carinatus,** *Wall. in Asiat. Research.* xii. 570, t. 5, and *Cat.* 4467; leaves 1–2 in. elliptic obovate lanceolate or linear-oblong obtuse or acute, corolla nearly glabrous within, fruit small ellipsoid. *Wight Contrib.* 47; *Dcne. in DC. Prodr.* viii. 625. Sarcolobus sp., *Griff. Notul.* iv. 55, and *Ic. Pl. Asiat.* t. 405.

SUNDERBUNDS and eastwards to MERGUI and the ANDAMAN ISLANDS.

A much smaller plant than *S. globosus*, more slender, with smaller narrower leaves very rarely 3 in. long, thicker in texture, the nerves very obscure, petiole ⅛–¼ in., corolla smaller, yellow, with lines of brown dots; anthers sessile. *Fruit* 3 in., curved, turgid, beaked, with several narrow undulate keels, pale yellow, fleshy. *Seeds* ½ in., like those of *S. globosus.*

29. PENTASACME, *Wall.*

Pendulous tufted glabrous herbs, with simple stems. *Leaves* opposite, subsessile, membranous, narrow. *Flowers* long, yellowish, in sessile axillary umbelliform cymes; pedicels filiform. *Calyx* 5-partite. *Corolla-tube* short, campanulate; lobes long, caudate, twisted, overlapping to the right. *Coronal-scales* 5, on the corolla-tube, entire or toothed. *Column* very short; anther-tips membranous; pollen-masses one in each cell, pedicelled, erect, ovoid, waxy, tips pellucid. *Stigma* included, conical or beaked. *Follicles* very slender, terete, straight, smooth. *Seeds* comose.—DISTRIB. Species 3–4; Indian and Chinese.

1. **P. caudatum,** *Wall. Cat.* 8234; very slender, leaves linear-lanceolate caudate-acuminate, corolla-lobes triangular at the base suddenly ending in long almost filiform tails. *Wight Contrib.* 60; *Dcne. in DC. Prodr.* viii. 627.

KHASIA MTS., alt. 0–3000 ft., common. Patkoi Mts. in UPPER ASSAM, *Griffith.* PEGU, *McClelland, Kurz.*

Densely tufted, flaccid, stems 12–18 in., rarely forked, leafy throughout their length. *Leaves* 2–3 by ⅙–⅔ in., thin, bright green, nerves obscure. *Flowers* ½ in. long, longer than the capillary pedicels. *Sepals* subulate. *Corolla-lobes* with obtuse tips; coronal-scales 4-fid. *Anther-tips* obtuse. *Stigma* obtuse. *Follicles* 2¼–3 in., with long slender points. *Seeds* $\frac{1}{10}$ in. long, ovate, flat, red-brown.

2. **P. Wallichii,** *Wight Contrib.* 60; leaves elliptic-lanceolate acuminate base acute, corolla-lobes gradually narrowed to the long obtuse tip. *Wall. Cat.* 8235; *Dcne. in DC. Prodr.* viii. 627; *Deless. Ic. Sel.* v. t. 87.

WESTERN HIMALAYA; Kumaon, alt. 3500 ft., *Madden,* &c. SILHET, *Wallich.* MISHMEE MTS., *Griffith.*

Habit of *P. caudatum,* but stems stouter; leaves 2–3 by ¾–1¼ in., nerves beneath distinct, setulose; flowers much longer, with broader corolla-lobes; coronal-scales minute; anthers acuminate; stigma shortly beaked; follicles rather stouter; seeds much the same.

30. GYMNEMA, *Br.*

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in crowded umbelliform cymes. *Calyx* 5-partite. *Corolla* subrotate, campanulate or urceolate; lobes thick, twisted, subvalvate or narrowly overlapping to the right. *Corona* 0, or of 5 fleshy processes adnate to the corolla-throat or tube.

Column short; anther-tips small, membranous; pollen-masses one in each cell, ovoid-oblong, waxy, pedicelled, erect. *Stigma* large, conical, clavate or capitate, exserted. *Follicles* slender or turgid, terete, smooth, acuminate. *Seeds* comose.—DISTRIB. Species 25; Asiatic, African, and Australian.

* Corolla-tube short, with fleshy coronal processes on the throat, the free points of which (except in *rotundatum*) protrude above the sinus, and are produced downwards on the tube as double villous ridges. Bracts obsolete.

1. **G. sylvestre,** *Br. in Mem. Wern. Soc.* i. 33; branches slender and petioles cymes and sepals finely closely pubescent, leaves 1–2½ in. elliptic or obovate acute rarely cordate glabrous or puberulous beneath, cymes small 2-nate peduncled nearly flat, corolla $\frac{1}{10}$ in. diam. lobes glabrous, follicles slender glabrous, seeds narrow. *Wight Contrib.* 44, and *Ic.* t. 349; *Wall. Cat.* 8184 A; *Dalz. & Gibs. Bomb. Fl.* 151; *Grah. Cat. Bomb. Pl.* 120; *Dcne. in DC. Prodr.* viii. 621. G. melicida, *Edgew. Banda Fl.* 50. Periploca sylvestris, *Willd. Sp. Pl.* i. 1252. Asclepias geminata, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 45.

BANDA, *Edgeworth.* DECCAN PENINSULA; from the Concan to Travancore.—DISTRIB. Trop. Africa.

A stout large woody climber. *Leaves* rarely pubescent above, thinly coriaceous; petiole slender or stout, ¼–½ in. *Cymes* ½ in. diam., subglobose, pedicels slender. *Corolla-lobes* short. *Follicles* 2–3 by ⅓ in., terete, rigid. *Seeds* ½ in. long, narrowly ovoid-oblong, flat with a broad thin wing, pale brown.—The leaves in Wight's figure are unusually large.

VAR. *ceylanica*; leaves ovate base cordate softly pubescent on both surfaces. G. sylvestre, *var.* Decaisneana, *Thw. Enum.* 197, *excl. syn.*—Ceylon, ascending to 3000 ft.

2. **G. hirsutum,** *Wight & Arn. Contrib.* 44; branches petioles leaves on both surfaces and cymes densely softly pubescent, leaves 1½–2½ in. broadly ovate or cordate acute or acuminate, cymes 2-nate subsessile few- or many-fld., corolla ¼ in. diam., lobes thick ciliolate, follicles slender glabrous. *Wight Ic.* t. 1272; *Wall. Cat.* 8185; *Dcne. in DC. Prodr.* viii. 622. G. Decaisneanum, *Wight Ic.* t. 1271.

BEHAR; at Rotas, *J. D. H.*; Nilgherry Mts., *Wight*, &c.

Much stouter than *G. sylvestre*, with broader more ovate and cordate leaves softly pubescent on both surfaces with shorter thicker petioles, and much larger flowers, in more sessile cymes with shorter thicker pedicels.—The Behar specimen is in fruit only and may belong to *G. sylvestre*, though the leaves are pubescent on both surfaces. I have seen no ripe seeds of the Nilgherry plants. In Wight's figure of *G. Decaisneana*, the leaves are glabrous above, which is opposed to his description and specimens. The distinctions he indicates between this and *hirsutum* do not exist.

3. **G. molle,** *Wall. in Wight Contrib.* 45, and *Cat.* 8186; branches petioles leaves beneath and cymes finely pubescent, leaves ovate oblong or cordate acute or acuminate, cymes subsessile dense-fld., corolla ⅛ in. diam. lobes ciliate, follicles woody broad turgid below the middle pubescent, seeds ovate. *Dcne. in DC. Prodr.* viii. 622.

UPPER BURMA; Irawaddi, near the Petroleum wells, and at Taong-dong, *Wallich.*

A stout climber. *Leaves* very variable, some 2–2½ by 1–1½ in., others 3 in. and as broad, deeply cordate, above glabrous or puberulous; petiole slender, ⅓–¾ in. *Cymes* small, irregular. *Sepals* hirsute. *Corolla-lobes* thickened, glabrous. *Follicles* 2½–3 in., ¾–1 in. broad at the thickest part. *Seeds* ½ in. long, very different from those of the preceding species.—This is very near the Chinese *G. affine*, Dcne. (*G. parviflorum*, Wall. Tent. Fl. Nep. 50), which has broad seeds and similar follicles, but the flowers are larger. Though Upper Burma is beyond British India, the species is so likely to be found in the latter that I (as in like instances) introduce it.

4. **G. acuminatum,** *Wall. Tent. Fl. Nep.* 50; *Cat.* 8187; branches stout, petioles leaves beneath cymes and sepals densely tomentose, leaves 3–6 in. coriaceous ovate acuminate, cymes peduncled globose, corolla $\frac{1}{8}$ in. diam. lobes glabrous not ciliate, follicles turgid ovoid beaked woody, seeds large elliptic broadly winged. *Wight Contrib.* 45; *Dcne. in DC. Prodr.* viii. 622. Cynanchum acuminatum, *Herb. Ham.* Asclepias acuminata, *Roxb. Hort. Beng.* 21, and *Fl. Ind.* ii. 55.

EAST BENGAL, *Griffith.* SILHET and TENASSERIM, *Wallich.* CHITTAGONG, *Roxburgh.* MALACCA, *Griffith, Maingay.*

A large climbing shrub, bark of old wood spongy and split (Roxburgh). *Leaves* coriaceous, rather shining above; petiole $\frac{1}{2}$–1 in. *Calyx* villous. *Follicles* 3 in. long, base cordate, thickly woody, narrowed into a stout beak, glabrous. *Seeds* $\frac{2}{3}$ in. long, flat, wing broad membranous.

5. **G. latifolium,** *Wall. in Wight. Contrib.* 45, and *Cat.* 8188; branches stout petioles leaf-nerves beneath cymes and sepals finely pubescent, leaves large orbicular acute or cuspidate, cymes 2-nate peduncled very many-fld. globose, pedicels slender, corolla-lobes ciliolate thickened and puberulous, follicles slender punctate, seeds narrow. *Dcne. in DC. Prodr.* viii. 623.

SILHET; BURMA, at Trogla and the Saluen river, *Wallich.*

Leaves 4–5 in. long and nearly as broad, base rounded or subacute, glabrous above except the puberulous midrib, pale beneath; nerves spreading; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* $\frac{1}{2}$–1 in. diam.; peduncle $\frac{1}{4}$–$\frac{1}{3}$ in.; pedicels very slender. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{10}$ in. diam. *Follicles* 3 in. long, thinly coriaceous. *Seeds* as in *G. sylvestre.*

6. **G. glabrum,** *Wight Contrib.* 45; branches stout and petioles leaf-nerves beneath and cymes and sepals finely pubescent, leaves large broadly ovate or oblong acuminate, cymes 2-nate peduncled globose many-fld., pedicels slender, corolla very minute, lobes glabrous not ciliate thickened, follicles fusiform. *Wall. Cat.* 8189; *Dcne. in DC. Prodr.* viii. 623.

BURMA; at Taong-dong, *Wallich.*

Very similar in foliage to *G. latifolium,* but the leaves are hardly so rounded and the petioles 1–1$\frac{1}{2}$ in. long; the flowers $\frac{1}{16}$–$\frac{1}{12}$ in. diam., and the follicles are lanceolate in outline, 4 by 1 in., thinly woody, glabrous, smooth; the seeds broadly ovate $\frac{1}{2}$ in. long, flat.

7. **G. rotundatum,** *Thwaites Enum.* 197; branches petioles leaves beneath cymes and sepals tomentose, leaves long-petioled rounded-ovate obtusely acuminate subpilose above, petiole glandular, cymes 2-nate peduncled densely many-fld., sepals rounded, corolla-lobes not ciliate quite glabrous, coronal processes wholly below the sinus.

CEYLON; central province, alt. 3000 ft., *Thwaites.*

I have seen but one specimen; it differs from *G. latifolium* chiefly in the longer petioles, 1–1$\frac{1}{2}$ in. and peduncles. The fruit is wanting to tell its affinity. It differs from all others of this section in the coronal processes having no free points between the sinus.

8. **G. lactiferum,** *Br. in Mem. Wern. Soc.* i. 33; branches petioles and nerves beneath glabrous or puberulous, leaves ovate oblong or lanceolate acuminate point often long, cymes peduncled and broadly oblong or rounded, sepals glabrous or sparsely hairy, corolla $\frac{1}{8}$ in. diam. lobes short ciliolate glabrous. *Wight Contrib.* 44; *Dcne. in DC. Prodr.* viii. 622.

KHASIA MTS., MALAY PENINSULA, and CEYLON.—DISTRIB. Sumatra, Borneo.

A stout climber. *Leaves* 2–4 by $\frac{3}{4}$–1$\frac{3}{4}$ in., coriaceous, brown when dry; nerves

3–4 pairs, very oblique; petiole slender, $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* few or many-fld., peduncle shorter than the petiole, flowers subglobose, $\frac{1}{6}$ in. diam. *Follicles* not seen.

VAR. 1. *lactiferum proper*; branches pubescent, leaves glabrous on both surfaces, sepals nearly glabrous. G. lactiferum, *Br. l. c.* G. zeylanicum, *Dcne. in DC. Prodr.* viii. 622. Asclepias lactifera, *Linn.*—Ceylon.

VAR. 2. *nitens*; branches glabrous, leaves glabrous or the midrib and nerves beneath pubescent, sepals glabrous or sparsely hairy. G. nitens, *Blume Mus. Bot.* i. 149, t. 29; *Miquel Fl. Ind. Bat.* ii. 498. G. malayanum, *Griff. Notul.* iv. 56, and *Ic. Pl. Asiat.* t. 394.—Malay Peninsula from Mergui to Malacca, Sumatra, Borneo.

VAR. 3. *khasiana*; branches and nerves of leaf beneath pubescent, leaves often lanceolate.—Khasia Mts. at Churra, *J. D. H. & T. T.*

VAR. 4. *Thwaitesii*; leaves softly pubescent beneath, sepals membranous pubescent.—Ceylon, *Thwaites* (N. 2549). This resembles *G. sylvestre* and *acuminatum*, but the flowers are larger and the calyx is very different.

VAR. 4? *Walkeri*; branches and leaves quite glabrous, cymes sessile puberulous, sepals puberulous membranous.—Ceylon, *Walker*.

9. **G. Maingayi**, *Hook. f.*; branches slender petioles leaves beneath cymes and sepals softly finely pubescent, leaves small ovate or ovate-cordate acuminate few-nerved, cymes sub-sessile, flowers few minute, corolla-lobes not ciliate.

MALACCA, *Maingay* (Kew. Distrib. 1111).

Leaves 1–2 in. and branches bright yellow-brown when dry, nerves 2–3 pairs; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Pedicels* slender, $\frac{1}{10}$–$\frac{1}{6}$ in., bracts most minute. *Sepals* oblong. *Corolla* glabrous, $\frac{1}{6}$ in. diam., lobes rather narrow.—This resembles a good deal *G. affine* of China and *G. sylvestre*, but the cymes are sessile and leaves much smaller.

** Corolla-tube with double villous (rarely glabrous) ridges below the sinuses, not produced into fleshy points (see also *G. rotundatum*). BIDARIA, *Dcne.*

† *Corolla-tube short, broad, hardly exceeding the linear-oblong sepals; coronal-processes large.*

10. **G. tingens**, *Wight & Arn. Contrib.* 45; glabrous or nearly so, leaves membranous broadly ovate usually cordate acute acuminate or caudate, petiole 1–1$\frac{1}{2}$ in., cymes 4–6 in. corymbose at length racemose, peduncle shorter than the petioles, sepals glabrate, corolla-lobes glabrous broadly ovate or oblong. *Wall. Cat.* 8190. G. tingens *var.* cordifolia, *Wight Ic.* t. 593. Bidaria tingens, *Dcne. in DC. Prodr.* viii. 623, *partly.* Asclepias tingens, *Roxb. Hort. Beng.* 21, and *Fl. Ind.* ii. 53.

TROPICAL HIMALAYA, from Kumaon to Sikkim; ASSAM; SILHET; LOWER BENGAL at Monghyr; PEGU and TRAVANCORE; Annamallay hills, alt. 4000 ft. *Beddome*.

An extensive climber; branches soft, not woody. *Leaves* 4–6 by 2–3 in., bright green; nerves 4–6 pairs. *Cymes* many-fld., elongating into a spiral raceme; bracts oblong; pedicels rather exceeding the peduncles; flowers $\frac{1}{3}$ in diam., pale yellow. "*Follicles* 4 by 1 in. ovate-lanceolate, spreading, smooth fleshy" (Roxb.).—The western localities for this plant are doubtful, a specimen from Royle's Herb. is labelled by Falconer "Kharia Pass," another from Vicary "Gomulepore." The Annamallay specimen is indistinguishable and suggests the probability of this and *G. montanum* being forms of one species.

11. **G. montanum**, *Hook. f.*; glabrous or nearly so. Leaves 4–5 in. large coriaceous oblong or ovate-oblong or oblong-lanceolate obtuse acute or acuminate, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., cymes corymbose at length racemose, peduncle shorter than the petiole, sepals ciliate glabrate, corolla-lobes oblong.—G. tingens *var.* ovalifolia, *Wight Ic.* t. 592. Bidaria tingens, *Dcne. in DC. Prodr.*

viii. 623, partly. B. elegans, *Dalz. & Gibs. Bomb. Fl.* 151. ? Asclepias montana, *Roxb. Fl. Ind.* ii. 45.

DECCAN PENINSULA, from the Concan Southwards, on the Ghats.

This may, as Wight suggests, be a variety of *G. tingens*, but I find no intermediate forms; it differs in the shape and coriaceous nature of the leaves, their short petioles, and in the shorter peduncles. I have seen no fruit. There appear to be three forms of it.

VAR. 1. Leaves usually ovate, petiole short, cymes many-fld., corolla glabrous.—The Concan.

VAR. 2. *Beddomei*; leaves more oblong or oblong-lanceolate, petiole ¼-½ in., cymes few-fld., flowers larger, corolla glabrous.—Annamallay hills, alt. 5000 ft. *Beddome*.

VAR. 3. *pubiflora*; leaves of var 2., cymes few-fld.. corolla pubescent externally.—Nilgherry hills at Nedawullum, alt. 7000 ft., *Wight, Clarke*. Clarke's specimens have longer peduncles and petioles and densely pubescent cymes.

12. **G. elegans,** *Wight & Arn. Contrib.* 46; glabrous or shoots and cymes puberulous, leaves 2–4 in. membranous ovate-cordate acute or acuminate, cymes few-fld., peduncles slender shorter than the petioles, sepals ciliate, glabrate, corolla-lobes obovate-oblong. *Wight Ic.* t. 830; *Wall. Cat.* 8191. Bidaria elegans, *Dcne. in DC. Prodr.* viii. 623.

DECCAN PENINSULA; hills of the South Carnatic from the Nilgherries to Travancore, *Wight*, &c.

Much smaller and more delicate than *G. tingens*, with smaller leaves, more slender petioles and pedicels. *Follicles* 2½–3 by ½ in., narrowly lanceolate, glabrous, straight. *Seeds* ⅓ in. long, ovate, with a broad border.—As Wight well remarks, it is difficult to distinguish this from *G. tingens* except by habit, size, and the few-fld. cymes.

†† *Corolla-tube much exceeding the sepals; coronal-processes elongate, nearer to the base than to the lobes, often faint and glabrous.*

13. **G. pergularioides,** *Wight & Gardner mss.*; branches very slender and petioles and cymes puberulous, leaves membranous elliptic- or oblong-lanceolate caudate-acuminate base rounded or acute, peduncles equalling the petioles, pedicels very short, corolla-lobes ovate-lanceolate. Bidaria pergularioides, *Thwaites Enum.* 198? Cynanchum cuspidatum, *Thunb. Obs. in Cynanch.* 5; *Dcne. in DC. Prodr.* viii. 548.

CEYLON, *Walker, Gardner*, &c.

Leaves very variable, 1–6 by ½–2 in, nerves arching or very oblique; petiole ¼–¾ in, slender. *Cymes* dense-fld.; flowers almost capitate. *Sepals* broadly oblong, not half as long as the corolla-tube, which is ⅓ in. and as long as the lobes. *Corolla-tube* yellow, tinged with red, ⅙ in. long. "*Follicles* 5–6 in. long, ¼ in. broad, linear-lanceolate, much attenuate, puberulous, at length glabrate," *Thwaites*.

VAR. *Gardneri*, Thwaites *l.c.*; leaves smaller 1–1½ in. elliptic-lanceolate more coriaceous, follicles shorter.

14. **G. stenoloba,** *Hook. f.*; glabrous or nearly so, leaves membranous lanceolate acuminate, cymes few-fld., peduncles equalling the petioles, pedicels short, corolla-lobes linear, stigma bifid.

CEYLON, *Walker*.

Closely allied to *G. pergularioides*, but the cymes are few-fld., the flowers much larger, the corolla-tube ⅓ in. long, the lobes narrowly linear, the column much longer and more slender and the stigma 2-fid. The follicles answer to the description of those of *G. pergularioides*, but are quite glabrous.

15. **G.? Thomsoni,** *Hook. f.*; quite glabrous, leaves linear-lanceolate coriaceous, cymes simple or branched long-peduncled, pedicels long, corolla-

lobes linear with reflexed margins, anthers with membranous margins and a membranous ligule behind and below the inflexed tip, stigma broadly turbinate.

SIKKIM HIMALAYA, alt. 5–6000 ft., *Thomson.*

Stems slender. *Leaves* 3–6 by $\frac{3}{4}$–$3\frac{1}{2}$ in., base acute or narrowly rounded; nerves oblique, very faint; petiole stout, $\frac{1}{4}$–$\frac{3}{4}$ in. *Peduncle* $\frac{1}{4}$–$1\frac{1}{2}$ in., rather slender; flowers umbelled, pedicels twice or thrice as long as the corolla-tube. *Sepals* very small, broadly oblong. *Corolla-tube* $\frac{1}{6}$ in.; lobes as long, spreading, thick.—A very remarkable plant, resembling *G. stenoloba*, but differing totally in the texture of the leaves, the reflexed margins of the corolla-lobes and especially in the winged anthers with a membranous ligule behind the tip and parallel to it. It is probably a new genus, but, without the fruit, I do not venture to propose it as such.

DOUBTFUL SPECIES.

BIDARIA INODORA, *Dcne. in DC. Prodr.* viii. 624. "From sandy places near Pondicherry (Cynanchum inodorum v. Ganosma inodora, *Lour. Fl. Coch.* 166). A climber with fistular glabrous stems, leaves rounded-ovate or -lanceolate quite glabrous base rounded or cordate, petiole slender, peduncles short, pedicels longer, flowers puberulous, tube hairy within, stigma conical emarginate exceeding the anthers" (Dcne. *l.c.*). I have no idea what this is; it is probably a very common plant.

31. GONGRONEMA, *Dcne.*

Glabrous twining shrubs or undershrubs. *Leaves* opposite. *Cymes* various, axillary; flowers small. *Calyx* 5-partite. *Corolla* urceolate subrotate or broadly campanulate, lobes narrowly overlapping to the right. *Column* short; coronal scales adnate to the bases of the anthers or 0. *Anther-tips* inflexed, concealing the stigma; pollen-masses solitary in each cell, ovoid, waxy, erect; stigma convex clavate or conical. *Follicles* acuminate. *Seeds* comose. DISTRIB. Species about 10; Asiatic, African, and Australian.

* Corolla nearly rotate, tube short.

1. **G. nepalense,** *Dcne. in DC. Prodr.* viii. 624; glabrous or cymes puberulous, leaves large oblong or ovate acuminate base rounded or cordate, cymes very long-peduncled bracteate, corolla-tube short open, lobes ovate, coronal process small recurved or obsolete. Gymnema nepalense, *Wall. Tent. Fl. Nep.* 50, t. 38, the *left-hand leaf only*, and *Cat.* 8192; *Wight Contrib.* 46.

SUBTROPICAL HIMALAYA; from Kumaon to Sikkim, alt. 2–4000 ft. KHASIA MTS., alt. 3–5000 ft.

An extensive twiner, shoots and cymes puberulous. *Leaves* 3–6 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., membranous, nerves arching; petiole 1–2 in. *Peduncle* 2–6 in., generally branching into 3 long divaricate arms, each bearing three many-fld. umbels, pedicels short. *Sepals* ovate. *Corolla* $\frac{1}{4}$ in. diam., yellow. *Follicles* slender, $2\frac{1}{2}$–3 by $\frac{1}{4}$ in.

VAR. *sagittatum*; leaves linear-oblong base rounded or cordate. G. sagittatum, *Dcne. l.c.* Gymnema sagittatum, *Wall. Cat.* 8194; *Wight Contrib.* 46. G. nepalense, *Wall. Tent. Fl. Nep.* t. 38 (*except the left-hand cordate leaf*). G. columnare, *Wall. Cat.* 8193; *Wight & Arn. l.c.* Gongronema columnare, *Dcne. l.c.*—Silhet, Assam, and Chittagong. Except the narrower leaves and usually shorter peduncles I can find no difference between *G. sagittatum* and *nepalense*. The processes at the base of the column vary very much.

** Corolla-tube inflated, equalling or exceeding the lobes in length.

2. **G. Wallichii,** *Dcne. in DC. Prodr.* viii. 624; quite glabrous, leaves elliptic-oblong or -lanceolate acute or acuminate, cymes subsessile few-fld., corolla-tube hairy within lobes short ovate. Gymnema Wallichii, *Wight Contrib.* 46; *Wall. Cat.* 8195 A.

MALACCA (? Finlayson), *Griffith, Maingay* (Kew Distrib. 1113).

Leaves 3–6 by 1–2 in., firmly membranous; nerves 5–6 pairs, arched; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* small; pedicels very unequal. *Sepals* small, oblong. *Corolla* $\frac{1}{4}$ in. diam., lobes spreading. *Coronal-scales* broad, recurved, apparently confluent with the anther-base. *Anther-tips* large, exserted. *Follicles* 6 by $\frac{1}{3}$ in., gently curved from base to tip, smooth. *Seeds* $\frac{1}{3}$ in. oblong, wing broad recurved.—Finlayson's specimens in Herb. Wallich have no locality given.

3. **G. ventricosum,** *Hook. f.*; quite glabrous, leaves coriaceous ovate or ovate-lanceolate obtusely caudate-acuminate, cymes subsessile few-fld., corolla-tube glabrous within, lobes as long linear with recurved margins.

KHASIA MTS. (Herb. Calcutta).

Leaves 3 by 1–1$\frac{1}{4}$ in.; nerves 2–3 pairs, very prominent beneath, strongly inarching far within the margin; petiole stout, $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* very shortly pedicelled. *Sepals* very small. *Corolla* $\frac{1}{3}$ in. long. *Coronal-scales* broad, recurved. *Pollen-masses* smaller than the corpuscle.—In form of corolla this a good deal resembles *Gymnema Thomsoni.* I have seen only a solitary indifferent specimen of this plant.

G.? FINLAYSONII, *Dcne. in DC. Prodr.* viii. 625 (Gymnema Finlaysonii, *Wight Contrib.* 46; Wall. Cat.), is probably, like most of Finlayson's plants, from Siam. It is glabrous with ovate-cordate leaves, and has peduncled cymes of large flowers $\frac{1}{3}$–$\frac{1}{2}$ in. diam. The pollen-masses have long spiral pedicels.

32. MARSDENIA, *Br.*

Twining, rarely erect, shrubs or undershrubs. *Leaves* opposite. *Cymes* umbelliform, simple or branched, terminal or axillary; flowers medium-sized or small. *Calyx* 5-partite. *Corolla* campanulate or urceolate or salver-shaped, lobes narrow or broad, overlapping to the right. *Coronal scales* 5, usually subulate flattened (or 0), adnate to the anthers dorsally, erect. *Column* short; anthers with an inflexed tip; pollen-masses pedicelled, oblong or ovoid, waxy, erect. *Stigma* flat convex or beaked, sometimes very long. *Follicles* lanceolate or poniard-shaped. *Seeds* comose.—DISTRIB. Species about 50; chiefly tropical or subtropical, with one S. European.

A heterogeneous assemblage, amongst which perhaps *M. tinctoria, eriocarpa,* and *thyrsoidea* should form one natural genus, and the remainder a second. *M. thyrsoidea* is very remarkable in wanting the coronal scales.

SECT. I. **Eumarsdenia.** *Flowers* small. *Corolla* cylindric, shortly 5-cleft, mouth closed with a brush of short hairs. *Column* minute; anther-tips and coronal scales very short. *Stigma* truncate.

1. **M. tinctoria,** *Br. in Mem. Wern. Soc.* i. 30; nearly glabrous, leaves ovate or cordate acuminate or caudate, flowers in dense thyrsoid or rounded panicles, coronal scales subulate longer and narrower than the anther-tip, follicles finely pubescent. *Wight Contrib.* 40, and *Ic.* t. 589; *Wall. Cat.* 8173; *Griff. Notul.* iv. 52, and *Ic. Pl. Asiat.* t. 389; *Grah. Cat. Bomb. Pl.* 119; *Brand. For. Fl.* 332; *Kurz For. Fl.* ii. 201; *Dcne. in DC. Prodr.* viii. 615 *excl. syn. of Rheede.* M. monostachya, *Wall. mss.* Asclepias tinctoria, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 43. Pergularia tinctoria, *Spreng. Syst.* i. 844. P. parviflora, *Blume Bijd.* 1056. Cynanchum tingens, *Herb. Ham.*

SIKKIM HIMALAYA, alt. 2–3000 ft. ASSAM, SILHET, KHASIA MTS., and BIRMA at Prome, *Wallich* (cultivated in the Deccan and elsewhere in India).—DISTRIB. Sumatra, Java, China.

A tall climber; stem stout, smooth, glabrous or finely pubescent, as are the petioles, sometimes the leaves below, and cymes. *Leaves* 3–9 by 1–3 in., nerves spreading, glandular above at the petiole; petiole 1–2 in. *Cymes* short- or long-peduncled, rounded and $\frac{1}{2}$–1 in. diam. or elongate 3–6 in. long, thyrsoid, formed of interrupted clusters; pedicels short. *Sepals* ovate, pubescent. *Corolla* $\frac{1}{10}$ in. long, yellow, fleshy, glabrous externally; tube with deflexed hairs within. *Follicles* 3 in. long, $\frac{1}{2}$ in. diam., narrowed at the base. *Seeds* narrowly ovoid, $\frac{1}{2}$–$\frac{2}{3}$ in. long.—In the absence of any description or figure of the follicles, or of authentic specimens in fruit of the Sumatran plant on which the genus was founded, I am in doubt whether this or the following is the true *M. tinctoria.* The flowers are often deformed, very large, and the column is often replaced by rudimentary leaves. Decaisne erroneously quotes Rheede's Kada Kodi (Hort. Mal. ix. 72, t. 8) for this plant.

2. **M. eriocarpa,** *Hook. f.*; foliage of *M. tinctoria,* follicles shorter broader turgid at the base softly villous with long spreading hairs, seeds broadly ovate.

SILHET, *Herb. Wallich* (*Asclep.* 145 A). ASSAM, *Masters.*

Wallich on the ticket of his specimen (which has no Catalogue number) says of this "Marsdenia, tinctoriæ affinis, sed differt; E. Sylhet, introd. in H.B. Calc. Feb. 1840." Brandis describes the pod of *M. tinctoria* as "covered with long soft hairs," whence he probably has assumed that this is referable to *M. tinctoria,* and, if so, the plant I have described under that name must be named afresh. A reference to Marsden's Sumatran plant can alone solve the difficulty.

SECT. II. MACROCENTRUM. *Flowers* larger. *Corolla* subcampanulate; tube short, globose or subcylindric; lobes large, fleshy, spreading, and throat glabrous or villous. *Staminal column* large, filling the tube; coronal scales usually large, often exceeding the anther-tip.

* *Stigma not extended beyond the anthers.*

3. **M. Roylei,** *Wight Contrib.* 40; branches petioles leaves beneath and cymes finely pubescent or tomentose, leaves ovate-cordate acuminate, cymes corymbose, corolla-lobes pubescent without villous within, coronal scales slender subulate far exceeding the short anther-tips. *Brand. For. Fl.* 333; *Dcne. in DC. Prodr.* viii. 615.

EASTERN and WESTERN HIMALAYA; from Simla to Kumaon, ascending to 5000 ft. SIKKIM, alt. 4000 ft., *Clarke.*

Leaves 3–6 by 2–4 in., often velvety beneath; petiole $1\frac{1}{2}$–2 in. *Cymes* 1–$1\frac{1}{2}$ in. diam. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Stigma* dome-shaped. *Follicles* turgid, 3 in. long 1–$1\frac{1}{2}$ diam., straight, beaked, pericarp thick transversely rugose puberulous. *Seeds* $\frac{1}{2}$ in. long.

4. **M. tenacissima,** *Wight & Arn. Contrib.* 41; branches petioles leaves beneath and cymes velvety or tomentose, leaves broadly ovate base cordately 2-lobed acuminate, corolla-lobes pubescent without glabrous within, coronal scales coriaceous subulate hardly exceeding the ovate anther-tip. *Wight Ic.* t. 590; *Wall. Cat.* 8176; *Brand. For. Fl.* 333; *Kurz For. Fl.* ii. 201; *Dcne. in DC. Prodr.* viii. 616. Asclepias tenacissima, *Roxb. Cor. Pl.* iii. 35, t. 240, and *Fl. Ind.* ii. 31. A. tomentosa *and* A. echinata, *Herb. Madr.* Gymnema tenacissima, *Spreng. Syst.* i. 844.

WESTERN HIMALAYA; Kumaon, ascending to 4500 ft. NORTHERN OUDH, *Thomson.* BENGAL; Rajmahal hills, *Roxburgh.* CHITTAGONG, *Wallich.* AVA, *Kurz.* CEYLON, hotter parts of the Island, not common, *Thwaites.*—DISTRIB. Timor (*Miquel*).

Stem very stout. *Leaves* 4–7 by 3–5 in., often velvety above; petiole 2–3 in. *Cymes* much corymbosely branched. *Corolla* $\frac{1}{4}$ in. diam.; lobes oblong, ciliate *Stigma* between conical and dome-shaped. *Follicles* 5–6 in. long by $1\frac{1}{4}$–2 in. diam.,

lanceolate; pericarp very thick, longitudinally wrinkled, finely pubescent. *Seeds* ovate-oblong, $\frac{1}{2}$ in. long.—Pergularia crocea, *Zipp.* (*Miquel Fl. Ind. Bat.* ii. 497), of Java is very closely allied, but the coronal scales are much laterally compressed, project radially, and are 2-keeled towards the base.

5. **M. Hamiltonii,** *Wight Contrib.* 41; branches petioles nerves beneath and cymes furfuraceously puberulous, leaves oblong or oblong-ovate obtuse or acute base cordate, cymes corymbosely branched, corolla-lobes glabrous without and within, throat densely villous, coronal scales membranous subulate exceeding the anther-tips. *Wall. Cat.* 8174; *Dcne. in DC. Prodr.* viii. 614. Cynanchum reticulatum, *Herb. Ham.*

NORTHERN OUDH, *Hamilton.* WESTERN HIMALAYA; Subsewaliks, *Edgeworth.*

Leaves coriaceous, 2–3 by $1\frac{1}{2}$–2 in., pale; petiole $\frac{1}{2}$–1 in. *Cymes* corymbosely branched. *Corolla* $\frac{1}{10}$ to $\frac{1}{8}$ in. diam. *Stigma* quite flat with a central cone. *Follicles* not seen.

6. **M. Brunoniana,** *Wight & Arn. Contrib.* 40; glabrous or cymes and petioles puberulous, leaves orbicular-cordate acuminate membranous, cymes short few-fld. corymbiform, corolla-lobes glabrous within and without, anthers with a double flattened obtuse spur (or fold) at the base, coronal scales ovate acute a little longer than the short anther-tip. *Dcne. in DC. Prodr.* viii. 614; *Wight Ic.* t. 356.

COROMANDEL; near Cotermala, *Wight.*

Branches and petioles sometimes puberulous. *Leaves* 4–5 by 3–4 in., base shortly cordate, nerves slender; petiole 1–2 in., slender. *Cymes* $\frac{1}{2}$–1 in. diam.; peduncle shorter than the petiole. *Corolla* $\frac{1}{3}$ in. diam., lobes broadly oblong. *Stigma* broadly conical, 2-toothed.

7. **M. Jenkinsii,** *Hook. f.*; glabrous or puberulous, very stout, leaves broadly elliptic or orbicular cuspidate thickly coriaceous, corolla-tube globose, lobes glabrous without villous within, coronal scales subulate much exceeding the very short anther-tip.

ASSAM, *Jenkins* (*Herb. Calcutta*).

Branches as thick as the little finger. *Leaves* 7–10 by 5–7 in., pale beneath; nerves 6–8 pairs, diverging, straight or a little arched; petiole 2–4 in. *Cymes* small; peduncle short, very thick; flowers subumbellate, bracteate; pedicels stout, 1 in. *Sepals* $\frac{1}{4}$ in., lanceolate, pubescent. *Corolla* $\frac{3}{4}$ in. diam., lobes rounded fleshy. *Stigma* dome-shaped.

** *Stigma protruded far beyond the anthers.*

8. **M. lucida,** *Edgew. mss.*; branches petioles cymes and leaves beneath finely pubescent, leaves elliptic or ovate acute or obtusely acuminate, cymes corymbiform very shortly peduncled, corolla-lobes ciliate glabrous without sparsely hairy within, coronal scales subulate equalling the anther-tips, style many times longer than the column tip bifid. *Brand. For. Fl.* 333.

WESTERN HIMALAYA; Kumaon, *Strach. & Winterb.*; Nynetal, alt. 5–7000 ft., *Madden.*

Leaves 4–5 by 2–3 in., rather coriaceous, pale beneath; nerves arched; petiole 1–2 in. *Corymbs* many-fld.; peduncle stout, $\frac{1}{2}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Follicles* 5 in. long by 1 in. diam., straight, lanceolate; pericarp thickly coriaceous, glabrous. *Seeds* $\frac{2}{3}$ in. long, ovate-lanceolate.

9. **M. Griffithii,** *Hook. f.*; glabrous except the puberulous cymes, leaves elliptic obtusely acuminate coriaceous base rounded or cordate, cymes corymbiform shortly peduncled, corolla-lobes glabrous without sparsely hairy within,

coronal scales small obtuse shorter than the orbicular anther-tips, style as long as the column, tip 2-toothed. M. lucida, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–6000 ft.; at Mungbrea and Myrung, *Griffith, H. f. & T.*

Stem stout. *Leaves* 3–7 by 1½–3½ in., pale beneath; nerves slightly arched; petiole 1–1½ in. *Umbels* and *flowers* greenish yellow, very like *M. lucida*. *Follicles* not seen.

SECT. III. **Microcentrum.** *Clarke mss.* *Flowers* small. *Corolla* urceolate or tubular, shortly 5-cleft, glabrous within. *Anthers* spurred at the base behind. *Stigma* exserted, obtuse.

10. **M. Calesiana,** *Wight Contrib.* 41; branches petioles and leaves beneath and cymes densely pubescent, leaves broadly ovate-cordate acuminate membranous, cymes much corymbosely branched, corolla sparsely hairy without lobes narrow, coronal scales subulate shorter than the long anther-tips. *Wall. Cat.* 8175; *Dcne. in DC. Prodr.* viii. 616. Pergularia Calesiana, *Herb. Ham.*

CENTRAL and EASTERN HIMALAYA; Nepal Morung, *Hamilton*. SIKKIM, alt. 2000 ft., *Clarke.*

Stem stout. *Leaves* 4–6 in. long and nearly as broad, pubescent or glabrate above; petiole 1½–3 in., slender. *Cymes* shortly peduncled, 3 in. diam. *Corolla-tube* cylindric, ¼ in. long; lobes spreading and recurved, thick. *Column* nearly filling the tube.

11. **M. thyrsiflora,** *Hook. f.*; nearly glabrous except the puberulous cymes, leaves broadly ovate or oblong- or deltoid-ovate deeply cordate acuminate, cymes elongate of clusters of shortly peduncled flowers on a long rachis, corolla urceolate glabrous without and within, lobes lanceolate, coronal scales short rounded wholly adnate to the long subulate anther-tips. M. tinctoria, *in part, Herb. H. f. & T.*

BENGAL; in the Jheels, *Griffith, J. D. H. & T. T.* ASSAM, *Masters.*

Leaves 4–8 by 2–6 in., membranous; petiole 1–3 in. *Cymes* 4–6 in. long; rachis flexuous; pedicels very short. *Sepals* nearly glabrous, obtuse. *Corolla* $\frac{1}{12}$–$\frac{1}{10}$ in. long; lobes coriaceous. *Anther-tips* longer than the column, basal spurs very small. *Stigma* fusiform. *Follicles* 2 in. long, dagger-shaped, turgid below; pericarp thinly coriaceous, glabrous. *Seeds* ovate, ⅙–¼ in. long.—So similar to some forms of *M. tinctoria* in foliage and inflorescence as to be easily mistaken for that plant. The coronal scales may be said to be absent.

DOUBTFUL SPECIES.

M. ROTUNDIFOLIA, *Dcne. in DC. Prodr.* viii. 615; "branches thick glabrous; leaves rounded, obsoletely cordate, glabrous, shortly acuminate; petiole rather long, slender, puberulous; cymes subcontracted, many-fld.; peduncle equalling the petiole; corolla-lobes ovate-oblong, densely bearded within; coronal scales ovate-deltoid, equalling the column."—Communicated from the Calcutta Garden to Paris Herb. by *Griffith.*

33. **PERGULARIA,** *Linn.*

Twining subglabrous undershrubs. *Leaves* opposite, ovate-cordate, membranous. *Cymes* subumbelliform. *Flowers* greenish or yellow, rather large. *Calyx* 5-partite. *Corolla* salver-shaped, tube swollen at the base; lobes oblong or linear, overlapping to the right *Column* rather large; coronal scales large, membranous, adnate to the back of the anthers, erect, flattened dorsally or laterally, acute, simple or transversely bifid (2-lamellate above the middle), pollen-masses one in each cell, subcylindric clavate or globosely obovoid, waxy, erect. *Stigma* umbonate or capitate, rather longer than the anther-cells.

Follicles lanceolate, terete, rather turgid. *Seeds* ovate, concave.—DISTRIB. Species about 10; Asiatic and African.

The excessively sweet-scented *P. odoratissima*, Smith (Icones Pictæ, t. 15), is stated to be Indian, but the plant so called by Roxburgh, Wight, &c., is *P. minor*. Smith's figure exactly resembles *P. pallida*, which is nearly scentless.

* *Pollen-masses elongate-clavate or subcylindric.*

1. **P. pallida,** *Wight & Arn. Contrib.* 42; leaves ovate-cordate acuminate, flowers scarcely fragrant, corolla yellowish white, lobes linear much larger than the tube which is glabrous within, coronal scales with broad points not spurred behind. *Wall. Cat.* 8181; *Wight Ic.* t. 585; *Brand. For. Fl.* 334; *Kurz For. Fl.* ii. 203; *Dcne. in DC. Prodr.* viii. 619. P. coromandeliana *and* P. montana, *Dcne. l. c.* Asclepias pallida, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 48.

TROPICAL HIMALAYA; from Murree ascending to 5000 ft. eastward to SIKKIM and southward on the plains to BOMBAY and CENTRAL INDIA, BEHAR and BIRMA.

Except by the absence of the sweet scent and pale flowers I do not know how this can be distinguished from Smith's figure and description of *P. odoratissima*. *Follicles* in Roxburgh's figure 6 in. long and 1 broad ($1\frac{1}{2}$ as drawn partially open), lanceolate. *Seeds* $\frac{1}{2}$ in. long, broadly ovate.

** *Pollen-masses globosely obovoid or obscurely broadly obconic.*

2. **P. minor,** *Andr. Bot. Rep.* t. 184; leaves orbicular or ovate cordately 2-lobed acuminate, flowers very fragrant yellow or green, corolla-lobes oblong about equalling the tube or shorter, tube pubescent above within, coronal scales double inner with a long subulate point. *Bot. Mag.* t. 755. P. odoratissima, *Wight Contrib.* 43, and *Ic.* t. 414. *Kurz For. Fl.* ii. 203. Asclepias odoratissima, *Roxb. Hort. Beng.* 20; and *Fl. Ind.* ii. 46; *Wall. Cat.* 8182; *Grah. Cat. Bomb. Pl.* 120.

Cultivated or native throughout India, and the Eastern Islands, China and Japan; native of the Himalaya (*Brandis*). Tsegai hills in AVA, *Griffith.*

Though confounded with *P. odoratissima*, this appears to be perfectly distinct in the smaller flowers and short broad corolla-lobes. *Follicles* lanceolate, 3 in. long by $\frac{3}{4}$ in. diam.; pericarp thick, glabrous. *Seeds* $\frac{1}{3}$ in. long, broadly ovate.—The coronal scales vary excessively in length acuteness and in the comparative length of the outer and inner divisions.

3. **P. puberula,** *Miquel Fl. Ind. Bat.* ii. 495; leaves ovate or oblong-ovate acuminate, base rounded or cordate, sepals broadly ovate, corolla pubescent without and within, lobes linear longer than the tube, coronal scales laterally compressed 2-winged dorsally below produced into an inflexed subulate point exceeding the anthers.

PENANG, *Phillips.*—DISTRIB. Java.

Habit of *P. pallida*, from which the short sepals, pubescent corolla, and laterally much-flattened scales which project far outwards from the column, and the form of the pollen-masses, at once distinguish it.

34. STEPHANOTIS, *Thouars.*

Twining glabrous shrubs. *Leaves* opposite, coriaceous. *Cymes* umbelliform, axillary; flowers large, white. *Calyx* 5-partite, segments large. *Corolla* coriaceous, tubular or salver-shaped, tube cylindric, base swollen; lobes twisted, overlapping to the right. *Coronal scales* 0 in the Indian species (in others adnate to the anthers, erect, dorsally flattened). *Column* very short; anthers with an inflexed tip; pollen-masses one in each cell, erect, waxy, shortly

pedicelled. *Stigma* conical or shortly beaked, hardly or not exserted. *Follicles* very thick, obtuse or acuminate. *Seeds* comose.—DISTRIB. Species 14, Madagascar, Malay Islds. and China.

S. Maingayi, *Hook. f.*; quite glabrous, leaves broadly ovate-cordate acuminate, cymes on long stout peduncles, sepals large lanceolate acuminate, corolla-tube 1 in., lobes lanceolate acuminate, anther-tips long, coronal scales 0.

MALACCA; *Maingay* (Kew distrib. 1112).

Branches stout. *Leaves* 4–6 by 2–3 in., basal sinus acute, nerves about 8 pairs; petiole $\frac{1}{2}$–1 in. *Peduncle* 2–3 in., few-fld.; pedicels 1–1$\frac{1}{2}$ in.; bracts subulate. *Sepals* $\frac{3}{4}$ in., acuminate, coriaceous. *Corolla-tube* with 5 hairy ridges at the base within, lobes about equalling the tube. *Column* $\frac{1}{3}$ the length of the tube. *Anther-tips* as long as the rest of the column, obtuse. *Stigma* capitate.

35. LYGISMA, *Hook. f. Gen. Nov.*

A puberulous slender much diffusely branched twining shrub. *Leaves* small, opposite, lanceolate. *Flowers* small, in numerous axillary umbelliform cymes. *Sepals* ovate, eglandular. *Corolla* salver-shaped, tube very short, lobes long, linear, waved, obtuse, the lobes overlapping to the right below the middle, the upper half sharply doubled down inwards (buds hence truncate). *Corona* of minute obtuse appressed teeth at the back of the anthers. *Column* minute, fleshy, low, cylindric; anthers very short, with small rounded membranous tips; pollen-masses cylindric, clavate, waxy, erect, subsessile on the long corpuscle. *Stigma* included.

L. angustifolia, *Hook. f. Ic. Plant.* t. 1423. Marsdenia angustifolia, *Wight. Contrib.* 40; *Wall. Cat.* 8172; *Dcne. in DC. Prodr.* viii. 614.

BIRMA; hills near Prome, *Wallich.*

Leaves 1–2 by $\frac{1}{4}$–$\frac{1}{3}$ in., acute, glabrous when mature, base rounded, triple nerved at the base; petiole very short. *Cymes* in all the upper axils, many-fld.; peduncle $\frac{1}{3}$–$\frac{1}{2}$ in., very slender, pedicels $\frac{1}{8}$ in. *Sepals* obtuse, pubescent. *Corolla* glabrous, $\frac{1}{4}$ in. diam.—A very curious plant, the only Indian Asclepiad one known to me with the corolla-lobes doubled down inwards in æstivation, rendering the bud truncate.

36. TYLOPHORA, *Br.*

Twining, rarely erect, herbs or undershrubs. *Cymes* umbelliform or racemose; flowers small or minute. *Sepals* ovate or lanceolate. *Corolla* rotate; lobes broad, slightly overlapping to the right. *Coronal processes* fleshy, adnate to the very short column. *Anthers* very small with an inflexed tip; pollen-masses one in each cell, minute, globose or ovoid, waxy, erect or ascending rarely transverse or pendulous from the ascending pedicel. *Stigma* disciform, 5-gonal, included. *Follicles* acuminate, smooth. *Seeds* ovoid, flat. winged, comose.—DISTRIB. Species about 40; Asiatic, African, Australian and Oceanic.

The minute anthers (larger in *T. Iphisia*), forming a small ring round the disciform stigma, which is more or less overlapped by the short anther-tips, and the adnate usually gibbous or globose coronal processes are the best characters for this genus. The position of the pollen-masses, ascending, horizontal, or pendulous, cannot be depended upon, and is most difficult to ascertain in dried specimens; as is the exact form of the fleshy coronal processes.

* Stem short, erect or suberect, 1–2 ft. (perhaps longer and twining in *T. Iphisia*), sometimes twining at the tips.

1. **T. Govanii**, *Dcne. in DC. Prodr.* viii. 610; stem simple pubescent, leaves subsessile oblong elliptic or obovate, umbels simple peduncled, sepals linear, corolla-lobes lanceolate, coronal processes gibbous. Iphisia Govanii, *Wight Contrib.* 52; *Wall. Cat.* 8212. Vincetoxicum montanum, *Dcne. l.c.* 525.

WESTERN HIMALAYA; Kunawur to Kumaon, alt. 7–8000 ft., *Govan*, &c.

Rootstock slender, creeping. *Stems* 8–16 in., naked below. *Leaves* 1–1½ by ½–1¼ in., rarely linear or almost orbicular, obtuse or apiculate. *Umbels* rarely sessile; pedicels capillary; flowers dark purple, ⅓ in. diam. *Anthers* large for the size of the column; pollen-masses pendulous. *Stigma* umbonate.

2. **T. Helferi**, *Hook. f.*; softly pubescent, stem simple, leaves sessile ovate or lanceolate acuminate, umbels simple long-peduncled, sepals linear, corolla-lobes elongate-lanceolate, coronal processes gibbous.

TENASSERIM; *Helfer.*

Stem 8–12 in. *Leaves* 1½–2 by ½–1 in., pubescent on both surfaces, base rounded. *Peduncle* strict, equalling the leaves, pedicels capillary. *Corolla* ⅓ in. diam., purple?, lobes caudate. *Follicles* 1½ in., poniard-shaped, pubescent.—The position of the pollen-masses I could not ascertain, owing to the imperfection of the specimens.

3. **T. fasciculata**, *Ham. in Wight Contrib.* 50; *Ic.* t. 848; stem simple or branched glabrous below finely puberulous above, leaves petioled ovate or lanceolate acute glabrous, cymes peduncled umbelliform simple or compound, sepals lanceolate, corolla-lobes broadly ovate, coronal processes globose, follicles short turgid. *Wall. Cat.* 8204; *Dcne. in DC. Prodr.* viii. 608; *Dalz. & Gibs. Bomb. Fl.* 151.

SOUTH NEPAL; at Sukanagur, *Hamilton.* SOUTH CONCAN; Bababoodan hills, &c.; *Law, Dalzell*, &c.

Stems several from the root, 12–18 in., flexuous or climbing amongst grass. *Leaves* 1–2 by ¾–1½ in., coriaceous; petiole ⅛–1 in. *Peduncles* slender; pedicels capillary. *Corolla* ⅙ in. diam., fleshy in the Nepal specimens. *Pollen-masses* horizontal according to Wight, but I think erect. *Follicles* 1½–2 by ½–⅔ in., ovoid-lanceolate; pericarp very thick, glabrous. *Seeds* ¼ in. long, broadly ovoid, quite flat.—Wight correctly observes that the corpuscles in this and the following are almost 2-partite.

4. **T. macrantha**, *Hook. f.*; stem simple or branched finely pubescent, leaves petioled ovate acute glabrous, cymes peduncled simple or subcompound, sepals lanceolate, corolla-lobes ovate-lanceolate, coronal processes globose. T. fasciculata *var.* macrantha, *Wight Contrib.* 50; *Dcne. in DC. Prodr.* viii. 608.

NILGHERRY MTS., *Wight*, &c. PEGU, *Col. Eyre* (*in Herb. Calcutt.*)

This has the habit and foliage of *T. fasciculata*, but the flowers are twice as large, and the corolla-lobes ovate-lanceolate. The Pegu specimens seem identical with the Nilgherry ones. *Fruit* unknown.

5. **T. Iphisia**, *Dcne. in DC. Prodr.* viii. 610; quite glabrous, stem branched flexuous, leaves petioled ovate or lanceolate acuminate, cymes branched, sepals ovate, corolla subglobose, lobes ovate, coronal processes ovoid wholly adnate to the base of large anthers. *Deless. Ic. Sel.* v. t. 82; *Wight Ill.* t. 155 *bis f. e. & Ic.* t. 1276. Iphisia multiflora, *Wight & Arn. Contrib.* 52. T. fasciculata, *Thwaites Enum.* 197. T. pauciflora, *Hohenack. Pl. Ind. Or.* n. 1386.

NILGHERRY MTS., *Wight*, &c. CEYLON; Central province, alt. 4–7000 ft., *Walker*, &c.

Stem rather stout, 2–3 feet long. *Leaves* 1½–2½ by ¾–1½ in., dark green, rather coriaceous; petiole ⅓–½ in. *Peduncles* longer than the petiole; pedicels short. *Sepals* quite glabrous. *Corolla* ¼ in. diam., yellow or dark purple. *Anthers* large for the size of the column, horny, with broad inflexed tips; pollen-masses horizontal. *Follicles* 3–3½ in. long, poniard-shaped, glabrous. *Seeds* ⅓ in. long, narrowly ovate.—The anthers of this are much larger than in any of its congeners. Hohenacker's is the only Peninsular specimen that I have seen; it is identical with the Ceylon ones. The corpuscles are long, linear with a central groove, quite different from those of *T. fasciculata*.

** Stems and branches long, twining, and cymes perfectly glabrous; sepals always glabrous (see also *T. Iphisia*); coronal processes without free points (except *T. himalaica*).

6. **T. capparidifolia**, *Wight & Arn. Contrib.* 51; quite glabrous, leaves elliptic or elliptic-oblong obtuse acute or apiculate pale veined coriaceous, cymes shortly peduncled or sessile, pedicels capillary, flowers minute, sepals ovate, corolla subglobose, lobes short ovate, coronal processes globose. *Dcne. in DC. Prodr.* viii. 610; *Wall. Cat.* 8208. Asclepias tenuis, *Herb. Heyne.*

Travancore; Courtallam, *Heyne, Wight.*

Branches rigidly flexuous. *Leaves* 2–4 by ⅓–1⅓ in., rigid; petiole ⅛–¼ in. *Cymes* much shorter than the leaves, pedicels ¼–½ in. *Corolla* ⅛ in. diam. *Follicles* 3 in. long, poniard-shaped.—Wight describes the coronal processes as toothed on the inner margin below the tip, a character I fail to verify.

7. **T. globifera**, *Hook. f.*; quite glabrous, leaves short-petioled oblong or ovate acuminate or apiculate, cymes long-peduncled compound few-fld. pedicels capillary, sepals ovate-lanceolate, corolla-lobes short ovate, coronal processes very large globose as high as the anthers.

Malacca, *Griffith.* South Andaman Island, *Kurz.*

Leaves 1–3 by ½–1¼ in., dark brown when dry, base rounded or cordate, nerves few; petiole ¼–½ in. *Peduncles* 1–1½ in., very stout; pedicels ½–1 in. *Corolla* ⅓ in. diam. *Staminal column* very short, depressed.

8. **T. pauciflora,** *Wight & Arn. Contrib.* 44; quite glabrous, leaves long-petioled ovate-lanceolate or cordate acuminate, cymes long-peduncled few-fld. compound, sepals ovate acute, corolla-lobes short ovate, coronal processes very large globose as high as the anthers. *Wight Ic.* t. 1274; *Dcne. in DC. Prodr.* viii. 607. T. asthmatica β glabra, *Thwaites Enum.* 19. "Cynanchum flavens and bracteatum, *Thunb.*; *Dcne. in DC. l.c.* 549" (*Thwaites*).

Deccan Peninsula; from S. Canara to Malabar and Travancore, *Wight,* &c. Ceylon, not uncommon, *Thwaites.*

Branches rather stout. *Leaves* 2–4 by 1–2 in., rather thin, nerves slender; petiole ½–1 in. *Peduncles* longer than the petioles; pedicels very variable. *Corolla* ¼ in. diam. *Column* and *coronal processes* much as in *T. globifera,* from which this differs in the leaves and long petioles.—The North Bengal locality attributed to this in DC. Prodr. is doubtless an error. Thwaites' specimen of *T. asthmatica β glabra* is very imperfect, but I think referable to this.

9. **T. purpurea,** *Wall. in Wight Contrib.* 51, and *Cat.* 8208; quite glabrous, leaves oblong-lanceolate apiculate base cordate, cymes long-peduncled few-fld., sepals ovate, corolla-lobes short ovate, coronal processes gibbous. *Dcne. in DC. Prodr.* viii. 611.

Burma; banks of the Irawaddy, *Wallich.*

Resembles *T. pauciflora,* but the leaves are narrower, more cordate at the base, and the coronal processes less developed. The specimens are very insufficient. Wight

describes the processes of the column as toothed on the inner margin below the tip, and the pollen-masses as transverse.

10. **T. longifolia,** *Wight Contrib.* 50; quite glabrous, leaves lanceolate from a broad cordate base acuminate, cymes elongate bearing small distant umbels on the very long slender rachis, sepals ovate, corolla-lobes short ovate obtuse, coronal processes gibbous. *Wall. Cat.* 8205; *Dcne. in DC. Prodr.* viii. 608.

SIKKIM HIMALAYA, alt. 2000 ft., *Clarke.* KHASIA MTS., alt. 4–6000 ft., *Wallich*, &c.

Stem and *branches* slender. *Leaves* 3–6 by ¾–1½ in., membranous, nerves distant; petiole ⅓–½ in. *Cymes* very slender and few-fld. *Corolla* ⅙ in. diam., yellow. *Follicles* not seen.

11. **T. himalaica,** *Hook. f.*; quite glabrous, leaves petioled ovate-lanceolate acuminate base acute or rounded, cymes bearing short distant umbels on the very long slender rachis, sepals lanceolate, corolla-lobes oblong-ovate obtuse, coronal processes gibbous.

WESTERN HIMALAYA (Suhunsudhara), *Falconer.* SIKKIM HIMALAYA, alt. 3000 ft., *Thomson, Clarke.* KHASIA MTS., alt. 0–4000 ft., *Griffith*, &c.

Very closely allied to *T. longifolia*, but the leaves are very different; always contracted, generally acute, and never cordate at the base; and the flowers are twice as large, with narrow longer sepals, more membranous longer corolla-lobes, and a much larger column. *Follicles* 4–5 in., narrowly poniard-shaped. *Seeds* ¼ in. long, broadly ovate.—I have observed a very few hairs on the sepals.

12. **T. zeylanica,** *Dcne. in DC. Prodr.* viii. 608; quite glabrous, leaves large fleshy ovate elliptic or almost rounded acuminate acute or apiculate, cymes elongate bearing few- or many-fld. umbels or racemes on the divaricate branches, sepals ovate obtuse, corolla lobes oblong-ovate obtuse, coronal processes gibbous. T. micrantha, *Thwaites Enum.* 197. Cynanchum micranthum, *Thunb. Diss.* 6; *DC. l.c.* 548.

TRAVANCORE, alt. 2000 ft., *Beddome.* CEYLON; Central province, alt. 2–4000 ft.

A tall climber. *Leaves* 4–6 by 2–4 in.; midrib thick with a gland above at the insertion of the petiole; nerves spreading; petiole 1–1½ in. *Flowers* ⅙ in. diam.; pedicels slender. *Follicles* 4–6 in., slender. *Seeds* ½ in. long, linear-oblong.—In one of Beddome's specimens the flower-bearing tips of the branches are thickened and covered with spirally placed scars, each subtended by a minute bract at the insertion of the pedicels.

13. **T. tenuis,** *Blume Bijd.* 1062; very slender, quite glabrous, leaves small fleshy ovate elliptic or oblong obtuse acute or apiculate, base acute or rounded, peduncle capillary simple or branched bearing few-fld. sessile umbels, pedicels capillary, sepals ovate acute, corolla-lobes short ovate obtuse, coronal processes gibbous or globose. *Dcne. in DC. Prodr.* viii. 608. T. carnosa, *Wall. in Wight Contrib.* 49; *Wall. Cat.* 8200; *Wight. Ic.* t. 351; *Dcne. l. c.* 607; T. tenuissima, *Wight & Arn. Contrib.* 47; *Wight Ic.* t. 588; *Dalz. & Gibs. Bomb. Fl.* 150. *Dcne. l. c.* 607. Asclepias tenuissima, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 41. A. dichotoma, *Rottl. in Wall. Cat.* 8200 B.C. Ceropegia Decaisneana, *Miquel Pl. Hohenack.* n. 634.

BENGAL, *Roxburgh*; Salt Lakes near Calcutta and Sunderbunds, *Clarke.* DECCAN PENINSULA, from Canara southwards. BIRMA, *Wallich.* MALACCA, *Griffith, Maingay.* CEYLON, hotter parts of the Island, *Walker*, &c.—DISTRIB. Java, Borneo.

Very slender, prostrate or twining. *Leaves* rarely 1½ in. long, very variable in form and breadth, base sometimes cordate, nerves few indistinct; petiole ⅛–⅓ in. *Flowers* rarely ⅛ in. diam., dark purple; pedicels ⅓–½ in. *Pollen-masses* suberect. *Follicles* 3 in. long, poniard-shaped, pericarp membranous. *Seeds* ¼ in., ovate.

** Stem and branches long, twining, and leaves glabrous or pubescent; sepals always hirsute or pubescent.

† *Coronal processes wholly adnate to the column without free points above.*

14. **T. Belostemma,** *Benth. Gen. Pl.* ii. 771; softly hirsute throughout, leaves ovate-cordate acuminate, cymes simple subsessile, flowers few umbelled, coronal processes linear radiating from the base of the column.—Belostemma hirsutum, *Wall. in Wight Contrib.* 52, and *Cat.* 8211.

Nepal, *Wallich.* Khasia Mts.; Churra and below it, alt. 2–4000 ft., *J. D. H. & T. T.*

Hairs reflexed on stem and branches. *Leaves* $1\frac{1}{2}$–2 in., pale green when dry, hirsute on both surfaces; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Peduncles* shorter than the petioles. *Sepals* lanceolate, hirsute. *Corolla* $\frac{1}{4}$ in. diam., dull purple; lobes ovate, pubescent within. *Staminal column* contracted below the anthers. *Follicles* not seen.

15. **T. hirsuta,** *Wight Contrib.* 49; stem densely softly tomentose, leaves ovate or ovate-lanceolate acute or acuminate pubescent or tomentose on both surfaces, base rounded obtuse or cordate, peduncles long flexuous bearing distant few-fld. umbels at the flexures, corolla puberulous within lobes short, coronal processes subglobose. *Wall. Cat.* 8201; *Dcne. in DC. Prodr.* viii. 607. T. Jacquemontii, *Dcne. l. c.* Gymnema hirsutum, *Wall. Tent. Fl. Nep.* 50.

Tropical Himalaya, ascending to 5000 ft. in Kumaon, from the Punjab eastwards (Pathankola, *Clarke*). Assam, *Jenkins.* Khasia Mts., alt. 2000 ft., *J. D. H. & T. T.* Cachar, *Keenan.*

Stem rather stout; hairs reflexed. *Leaves* 3–7 by $1\frac{1}{2}$–4 in., sometimes only faintly hairy; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in., stout. *Peduncle* very variable in length, villous or hirsute; pedicels capillary, short or long. *Sepals* lanceolate, hirsute. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. diam, *Follicles* 2–$2\frac{1}{2}$ in., poniard-shaped, glabrous. *Seeds* $\frac{1}{4}$ in. long, narrowly ovate.

Var. ? *penangensis*; leaves minutely pustular on the upper surface at the bases of the hairs.—Penang, *Phillips.*—This, of which the specimens are very imperfect, may be *T. villosa*, Blume of Java, which strongly resembles *T. hirsuta*, and also *T. mollissima*, Wall. (Cat. 8202) of China.

16. **T. mollissima,** *Wight Contrib.* 49; *Ic.* t. 1275 (*not of Wallich*), stem densely softly tomentose, leaves oblong or linear-oblong acute or acuminate base rounded tomentose or villous on both surfaces, peduncles flexuous bearing distant few-fld. umbels, sepals lanceolate, corolla glabrous within lobes oblong, coronal processes subglobose hispid. *Dcne. in DC. Prodr.* viii. 607.

Nilgherry and Pulney Mts., *Wight.*

Very similar to *T. hirsuta*, differing in the form of the leaves. *Fruit* unknown.

17. **T. rotundifolia,** *Hamilt. in Wight Contrib.* 50; stem pubescent, leaves very shortly petioled orbicular or very broadly ovate obtuse or acute beneath and margins pubescent, base rounded or cordate, cymes many-fld. umbellate sessile or peduncled, pedicels long, sepals lanceolate hispid, corolla-lobes ovate, coronal processes globose. *Wall. Cat.* 8203; *Dcne. in DC. Prodr.* viii. 608.

Assam; Dongtala and Habora Ghat, *Hamilton.* Northern Oude, *Vicary.* The Concan, *Law, Stocks.* Travancore; Annamallay hills, *Beddome.*

Leaves 2–$3\frac{1}{2}$ in. long and often as broad, coriaceous, glabrous above; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Pedicels* $\frac{1}{2}$–1 in. long, nearly glabrous or pubescent. *Corolla* $\frac{1}{4}$ to nearly $\frac{1}{2}$ in. diam. *Follicles* not seen.

18. **T. Dalzellii,** *Hook. f.*; stem and cymes sparsely pubescent, leaves coriaceous or fleshy ovate oblong or cordate acute or acuminate glabrous or

nearly so, cymes sessile or peduncle short, rachis flexuous with umbels or racemes at the flexures, pedicels long capillary, sepals ovate hispid, corolla-lobes short, coronal processes gibbous.—T. carnosa, *Dalz. & Gibs. Bomb. Fl.* 150. Tylophora n. 23 and T. pauciflora? *Herb. Ind. Or. H. f. & T.*

CONCAN and MALABAR, *Stocks, Law,* &c.

Leaves very variable, 2–4 in., quite glabrous or puberulous on the petiole margins and nerves beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* nearly half as long as the leaves; rachis often zigzag, sometimes clavate, hispid at the insertion of the pedicels; flowers always numerous, sometimes in a globose mass $1\frac{1}{2}$ in. diam., usually laxer; pedicels $\frac{1}{4}$–1 in. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Follicles* 3–4 in. poniard-shaped, glabrous. *Seeds* $\frac{1}{3}$ in., broadly ovate.—This is the *T. carnosa* of Dalzell and Gibson, but not of Wight, from whose plant it differs in the pubescence, larger leaves, shorter peduncles, and many-flowered umbels. It differs from *T. rotundifolia* in the much smaller flowers and longer petioles; it also closely resembles *T. asthmatica,* but has shorter sepals and wholly adnate processes.

19. **T. exilis,** *Coleb. in Trans. Linn. Soc.* xii. 358, t. 16; stem slender and cymes finely sparsely villous, leaves ovate-oblong or -lanceolate acuminate nearly glabrous, peduncles long slender flexuous simple or branched bearing few-fld. sessile umbels, pedicels very short, sepals ovate hispid, corolla-lobes short, coronal processes gibbous. *Wight Contrib.* 50; *Wall. Cat.* 8206; *Dcne. in DC. Prodr.* viii. 608. Pergularia exilis, *Spreng. Syst.* i. 844.

ASSAM, *Masters.* SILHET, *Wallich.* CHITTAGONG, *Colebrooke.* MALACCA, *Griffith.*

Very similar to *T. tenuis,* but with larger leaves, hairy branchlets cymes petioles and midrib of the leaf above, and very short pedicels rarely $\frac{1}{4}$ in. long. *Follicles* $3\frac{1}{2}$ in. long, very membranous. *Seeds* $\frac{1}{4}$ in. long, ovate.

†† *Coronal processes adnate below to the column; tips free, reaching as high as the stigma.*

20. **T. cordifolia,** *Thwaites Enum.* 196; nearly glabrous, leaves small coriaceous ovate-cordate apiculate, peduncles very short 1–2-fld., sepals ovate glabrous, corolla-lobes short, coronal processes strongly laterally compressed, dilated upwards.

CEYLON; common in the central provinces, *Walker, Thwaites.*

Stem slender and petioles puberulous. *Leaves* $\frac{1}{2}$–1 in., thin, firm, shining; petiole $\frac{1}{10}$–$\frac{1}{6}$ in. *Peduncle* $\frac{1}{8}$–$\frac{1}{3}$ in., capillary. *Corolla* $\frac{1}{6}$ in. diam., dark purple, lobes obtuse. "*Follicles* usually solitary, 2 in. long, slender, glabrous" (*Thwaites*).—The column with its processes is obconic (as in some non-Indian species) from the upward dilatation of the processes which radiate from it.

21. **T. tenerrima,** *Wight Contrib.* 50; nearly glabrous, leaves ligulate or linear-lanceolate obtuse apiculate or acuminate, cymes peduncled 2–4-fld., sepals ovate-lanceolate hispid, corolla-lobes linear-oblong puberulous within, coronal processes gibbous or globose with free incurved cuspidate tips. *Wall. Cat.* 8207; *Dcne. in DC. Prodr.* viii. 610. Homostyles tenerrima, *Wall. mss.*

SUBTROPICAL HIMALAYA; alt. 3–6000 ft., from Kumaon, *Royle,* to Sikkim, *J. D. H.*

Stem very slender and much branched. *Leaves* 1–2 by $\frac{1}{10}$–$\frac{1}{3}$ in., nerveless; petiole very short. *Peduncles* capillary, usually shorter than the leaves; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Corolla* $\frac{1}{3}$ in. diam. *Follicles* not seen.

22. **T. asthmatica,** *Wight & Arn. Contrib.* 51; glabrous pubescent or tomentose, leaves ovate rounded or oblong apiculate acute or acuminate, base usually cordate, peduncles shorter than the leaves bearing 2–3 sessile few- or many-fld. umbels, pedicels long capillary, sepals long lanceolate hispid, corolla large lobes short acute, coronal processes gibbous or globose with free cuspidate

tips. *Wall. Cat.* 8210; *Wight Ic.* t. 1277; *Dalz. & Gibs. Bomb. Fl.* 150; *Thwaites Enum.* 197, *excl. var.* β; *Bentl. & Trim. Med. Pl.* t. 177; *Dcne. in DC. Prodr.* viii. 611. T. pubescens, *Wall. mss.* Asclepias asthmatica, *Willd.*; *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 33. A. tunicata, *Hort. Calc.* A. vomitoria, *Koen. mss.* Cynanchum vomitorium, *Lamk. Dict.* ii. 235. C. viridiflorum, *Sims. Bot. Mag.* t. 1929. "C. flavum *and* bracteatum, *Thunb.*;" *Thwaites*; *Dcne. in DC. l. c.* 549. C. Ipecacuanha, *Willd.* C. indicum, *Herb. Burm.* Hoya planiflora, *Wall. mss.*

N. & E. Bengal, Assam, Cachar, Chittagong and Birma to Malacca; Deccan Peninsula, abundant. Ceylon, common in the hotter districts.—Distrib. Siam, Malay Islds., Borneo.

Stem slender. *Leaves* 2–4 in., rather thickly coriaceous, very variable in width, rarely pubescent or tomentose on both surfaces; nerves few, spreading; petiole $\frac{1}{8}$–$\frac{3}{8}$ in. *Cymes* always more or less pubescent, hispid at the bases of the umbels. *Corolla* $\frac{1}{3}$ in. diam., dull yellow and purple within. *Follicles* very variable, poniard-shaped, divaricate, 3–4 in. and slender in Deccan specimens with a thin pericarp; turgid in the lower half, and only 2 in. long, with a thick pericarp, in some Ceylon specimens. *Seeds* $\frac{1}{3}$ in. long, broadly ovate.

23. **T. Wallichii,** *Hook. f.*; stem stout, cymes and petioles sparsely pubescent or puberulous, leaves fleshy oblong or ovate-oblong acuminate base cordate, peduncles long stout branched bearing few-fld. irregular umbels or clusters, sepals ovate pubescent, corolla subglobose fleshy shortly 5-lobed, coronal processes gibbous with free cuspidate tips (or 0), follicles very large ellipsoid ventricose. Gymnema Wallichii, in part, *Wight Contrib.* 46. G. sagittatum, *Wall. Cat.* 8194 B.

Singapore, *Wallich.* Penang, *Maingay.* Malacca, *Griffith, Maingay* (Kew Distrib. 1142).—Distrib. Borneo.

Leaves thickly coriaceous, 4–6 by $\frac{1}{2}$–2 in., narrowed at the cordate base, nerves spreading; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* often exceeding the leaves, branches divaricate. *Flowers* $\frac{1}{3}$ in. diam.; often fleshy and deformed with the column imperfectly developed cylindric and without coronal processes. *Follicles* very different from those of any congener, 4–5 by 1–1$\frac{1}{2}$ in., elliptic-lanceolate, narrowed equally to the base and tip, pericarp coriaceous. *Seeds* $\frac{1}{3}$ in. long, broadly ovate.—This very closely resembles in habit when dry *Gongronema Wallichii.*

37. TREUTLERA, *Hook. f. Gen. Nov.*

A stout glabrous twiner. *Leaves* opposite, thickly coriaceous. *Flowers* large, in axillary simple stoutly peduncled umbels. *Sepals* very small, ovate, glandular within. *Corolla* rotate, shortly 5-lobed; lobes broadly ovate, ciliolate, overlapping to the right. *Coronal* processes adnate to the backs of the anthers and equalling them, ovate, obtuse, fleshy. *Column* prominent; anther-tips inflexed, rounded; pollen-masses one in each cell, subcylindric, pedicelled, waxy, erect. *Stigma* hemispheric, 2-cuspidate, included.

T. insignis, *Hook. f. in Hook. Ic. Pl.* t. 1425.

Sikkim Himalaya, alt. 8–10,000 ft., *J. D. H., Anderson, Treutler.*

Branches terete, smooth. *Leaves* in distant pairs, 3–5 by 1$\frac{1}{2}$–3 in., ovate elliptic oblanceolate or elliptic-oblong, apiculate or acuminate, midrib thick; nerves 4–5 pairs, spreading, secondary indistinct; petiole stout, $\frac{1}{2}$–1$\frac{1}{2}$ in. *Peduncle* 1–2 in.; pedicels 1–1$\frac{1}{2}$ in., stout; bracts small, lanceolate. *Sepals* ciliate. *Corolla* 1–1$\frac{1}{2}$ in. diam., coriaceous, glabrous, dark purple. *Fruit* not seen.—This genus is very near *Marsdenia*, from which it differs conspicuously in the large rotate corolla with short rounded lobes. It is named after Dr. Treutler, a native of the province of Sikkim, who presented to Kew in 1875 a very large and valuable collection of its plants, inclusive of the present which is one of the most handsome of the Sikkim Asclepiads.

38. COSMOSTIGMA, *Br.*

A twining glabrous shrub. *Leaves* opposite, ovate or cordate. *Cymes* axillary, racemiform; flowers small, greenish. *Sepals* small. *Corolla* rotate, lobes overlapping to the right. *Coronal scales* adnate to the base of the anthers, and shorter than they are, erect, broad, membranous, truncate or 2-fid. *Column* very short, filaments fleshy; anther-tip broad, rounded, inflexed; pollen-masses obovoid-oblong, waxy, erect, pedicels long flexuous. *Stigma* broad, flat, 5-angled. *Follicles* large, linear-oblong, obtuse, smooth. *Seeds* comose.

C. racemosum, *Wight Contrib.* 42, and *Ic.* t. 591; *Dalz. & Gibs. Bomb. Fl.* 151; *Grah. Cat. Bomb. Pl.* 119; *Dcne. in DC. Prodr.* viii. 613. C. acuminatum, *Wight Ic.* t. 1270. Asclepias racemosa, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 32. Nerium piscidium, *Hort. Calc.*—*Rheede Hort. Mal.* vii. t. 32.

SILHET, CHITTAGONG, and the WESTERN GHATS, from the Concan southwards. CEYLON, common.—DISTRIB. Java.

A tall stout climber. *Leaves* deciduous, 3–5 by 1½–2½ in., rather coriaceous, rounded or ovate, finely acuminate or tip obtuse, base sometimes cordately 2-lobed, lobes conniving; petiole 1–2 in. *Peduncles* equalling the petioles, stout, straight; pedicels ½ in., stout, spreading, spirally arranged round the rachis; bracts 0. *Corolla* ⅓ in. diam., fleshy, speckled with brown. *Follicles* 7 in. long by 1½ in. diam., lanceolate or linear-oblong, obtuse, smooth. *Seeds* ⅔ in. long, broadly ovate.

39. DREGEA, *E. Meyer.*

Twining shrubs, glabrous or hoary. *Leaves* opposite, ovate or cordate, acuminate. *Cymes* axillary, umbelliform; flowers green. *Sepals* small. *Corolla* rotate, lobes broad, overlapping to the right. *Coronal scales* 5, hemispheric, fleshy, adnate to the column, spreading, inner angle cuspidate, the tooth incumbent on the anthers. *Column* very short, fleshy; anther-tips short inflexed; pollen-masses one in each cell, cylindric-oblong, shortly pedicelled, waxy, erect. *Stigma* conical or dome-shaped. *Follicles* thick, hard, winged or ribbed. *Seeds* comose.—DISTRIB. Species 6 or 7; Indian, Malayan, and tropical and S. African.

D. volubilis, *Benth. Gen. Pl.* 775; glabrous hoary or mealy, leaves ovate suborbicular or cordate acuminate, peduncles equalling or exceeding the pedicels many-fld., pedicels slender, flowers green, sepals triangular-ovate. Hoya viridiflora, *Br. in Mem. Wern. Soc.* i. 27; *Wight Contrib.* 39, and in *Hook. Bot. Misc.* ii. 98, t. 1, and *Ic.* t. 586; *Wall. Cat.* 8168; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 119; *Griff. Ic. Pl. Asiat.* t. 387, 388. Asclepias volubilis, *Linn. f.*; *Roxb. Fl. Ind.* ii. 36. Apocynum tiliæfolium, *Lamk. Encycl.* i. 214. Wattakaka viridiflora, *Hassk. in Flora,* 1857, 79.—*Rheede Hort. Mal.* ix. t. 15.

BENGAL, ASSAM and the DECCAN PENINSULA, from the Concan, southwards. CEYLON, in the hotter parts of the island.—DISTRIB. Java.

A stout tall climber, branches often pustular. *Leaves* 3–6 by 2–4 in., rather coriaceous, base rounded or cordate; nerves 4–5 pairs; petiole 1–3 in. *Peduncles* 1–3 in., rather slender; umbels drooping, very many-fld., subglobose; pedicels ½ in., slender. *Corolla* ½ in. diam., cupular, lobes triangular. *Stigma* dome-shaped. *Follicles* 4 in. long by 1–1¼ in. diam., broadly lanceolate, turgid, glabrous. *Seeds* 2 in. long, broadly ovate, pale, smooth and shining, border thick.

VAR. *Lacuna*, all parts hoary or mealy. Hoya Lacuna, *Ham. in Wall. Cat.* 8169; *Wight Contrib.* 39; *Dcne. in Jacq. Voy. Bot.* 108, t. 114, and in *DC. Prodr.* viii. 639. —North-West India from Kumaon to Oude and the Bombay Ghats. Bengal. Birma.

VAR. *angustifolia*, suberect, densely mealy or velvety, leaves ovate-lanceolate small.—Malabar and Bombay (a starved form).

40. **HETEROSTEMMA,** *W. & A.*

Twining nearly glabrous shrubs or undershrubs. *Leaves* opposite, often cordate, base 3–5-nerved. *Flowers* rather small, in shortly peduncled umbelled or racemose cymes. *Calyx* small, 5-fid or -partite. *Corolla* rotate, lobes broad triangular valvate. *Corona* of 5 large lobes spreading horizontally from the column and lying flat on the corolla. *Column* very small, depressed; anthers very minute, tip very short; pollen-masses one in each cell, minute, broad, compressed, sessile, waxy, erect. *Stigma* included, truncate, 5-angled. *Follicles* slender, straight, terete, pointed, pericarp thin. *Seeds* comose.—DISTRIB. Species about 10; Indian and Malayan.

* *Coronal processes orbicular, sessile.*

1. **H. Wallichii,** *Wight Contrib.* 42; branches hairy chiefly along two lines, leaves ovate broadly oblong or elliptic acuminate, coronal processes sessile orbicular with or without a small conical boss near the base. *Wall. Cat.* 8179; *Dcne. in DC. Prodr.* viii. 630. Heterostemma, sp. 4, *Herb. H. f. & T.*

NEPAL, *Wallich.* ASSAM, *Jenkins.* KHASIA MTS. at Nowgong, *J. D. H. & T. T.*

Leaves 3–7 by 2–4 in., base rounded or subcordate, bright green, thinly coriaceous; petiole ½–2 in. *Cymes* small, peduncle stouter than the petiole; flowers ⅓–½ in. diam., greenish. *Fruit* not seen.

2. **H. alatum,** *Wight Contrib.* 42; branches with two lines of hairs, leaves elliptic-ovate oblong or -lanceolate acuminate, nerves beneath winged, coronal processes ovate-lanceolate acuminate with a large ovate acute concave appendage on the surfaces. *Wall. Cat.* 8180; *Dcne. in DC. Prodr.* viii. 630.

CENTRAL and EASTERN HIMALAYA; Kumaon, *Royle*; Nepal, *Wallich*; SIKKIM, alt. 2–6000 ft., *J. D. H.* KHASIA MTS., alt. 4–6000 ft., *Lobb, J. D. H. & T. T.*

Leaves 3–6 by 1½–3½ in., rather coriaceous, light green, base acute or rounded, rarely cordate, nerves 3–4 pairs; petiole 1–2 in. *Peduncles* very short, stout; pedicels ¼–½ in., flowers ½–¾ in. diam., yellow. *Follicles* (immature) very slender, straight.

3. **H. stellatum,** *Hook. f.*; branches with very obscurely pubescent lines, leaves lanceolate or oblong-lanceolate acuminate, nerves beneath winged, corona stellately 5-lobed to below the middle, lobes triangular acute without appendages. Heterostemma, n. 3, *Herb. H. f. & T.*

KHASIA MTS.; at Myrung, alt. 6000 ft., *J. D. H.*

This resembles *H. alatum*, but the leaves are narrower with a more regular intermarginal nerve, and the corona is very different.

4. **H. tanjorense,** *Wight & Arn. Contrib.* 42; branches quite glabrous, leaves broadly or narrowly ovate oblong or oblong-lanceolate obtuse or apiculate, base rounded or subcordate, coronal processes orbicular-obovate with a large erect fleshy appendage on the surface. *Wight Ic.* t. 348; *Wall. Cat.* 1178; *Dcne. in DC. Prodr.* viii. 630. Stapelia involucrata, *Herb. Madr.* Glossostelma, nov. gen., *Wight mss.*

WESTERN PENINSULA; the Carnatic, in sandy places, *Wight.*

Leaves very variable, 3–5 by $1\frac{1}{2}$–3 in., tip usually rounded and apiculate. *Cymes* usually sessile, flowers $\frac{1}{3}$ in. diam.; coronal processes with an erect acute appendage. *Follicles* very slender, 4 in. long by $\frac{1}{4}$–$\frac{1}{3}$ in. diam., glabrous. *Seeds* $\frac{1}{2}$ in. long narrowly ovate.

VAR. *zeylanicum*; leaves acute or acuminate, flowers dark purple, appendages of the coronal processes larger obtuse or acute. H. tanjorense, *Thwaites Enum.* 198.—Ceylon, central province, ascending to 4000 ft.

5. **H. Dalzellii,** *Hook. f.*; branches glabrous or nearly so, leaves broadly or narrowly elliptic or ovate- or oblong-lanceolate acuminate, coronal processes spathulate without an appendage. H. Wallichii, *Dalz. & Gibs. Bomb. Fl.* 152 (*not of Wight*). Heterostemma, sp. 2, *Herb. Ind. Or. H. f. & T.*

The CONCAN; at Vingorla, and Malwan, *Dalzell, Stocks.*

Leaves as in *H. tanjorense*, of which this may be a variety, differing greatly in the corona, the lobes of which have no appendage proper, though there are traces of swellings at the bases in some specimens and at their backs in others, as if in the latter case the process was reduced and its appendage enlarged. In some specimens the apex is obscurely 3-lobed, in others the tip is subquadrate with a simple or bifid tip, and the sides acutely angled. The follicles appear shorter than in *H. tanjorense*, but they are not quite ripe in either species.

41. DITTOCERAS, *Hook. f. Gen. Nov.*

A stout pubescent twining shrub. *Leaves* opposite, long petioled, elliptic-ovate, acute. *Flowers* large, in sessile umbelliform few-fld. cymes. *Sepals* minute, ovate, obtuse, glandular within. *Corolla* rotate; lobes short, triangular, subacute, valvate in bud. *Corona* large, deeply 5-lobed, lying flat on the corolla, lobes orbicular-spathulate, with a minute boss at the base of each. *Column* depressed. *Anthers* minute, tips very short, incurved; pollen-masses very minute, subglobose, sessile on the minute corpuscle, waxy, erect. *Stigma* pentagonal, included. *Follicles* sub-cylindric, obtuse, recurved, pericarp very thick fleshy, endocarp hard shining. *Seeds* very large, narrowly ovoid-oblong, compressed, winged at the rounded base; coma short.

1. **D. Andersoni,** *Hook. f. in Hook. Ic. Pl.* t. 1422. Heterostemma, sp. 6, *Herb. Hook. f. & T.*

SIKKIM HIMALAYA, alt. 2–4000 ft.; *J. D. H., T. Anderson, Clarke.*

Branches leaves beneath, petioles and pedicels rusty-pubescent. *Leaves* 4–5 by 2–3 in., sometimes cordate, dark green, sparsely hairy above, nerves 4–5 pairs; petiole $1\frac{1}{2}$–2 in. *Corolla* $1\frac{1}{2}$ in. diam., sparsely hairy without, dark purple. *Follicles* 4–5 in. long, by $\frac{3}{4}$ in. diam., green when ripe. *Seeds* $1\frac{1}{4}$ in. long, black, coma as long as the rest of the seed, hairs spreading and reflexed.—Closely allied to *Heterostemma*, but widely differing in the large flowers, follicles, and seeds.

42. OIANTHUS, *Benth.*

Twining glabrous undershrubs, branches with two lines of pubescence. *Leaves* opposite. *Cymes* small, subsessile, few-fld. *Sepals* small, obtuse or acute. *Corolla* ovoid-urceolate or disciform, mouth contracted; lobes 5, very short, broad, valvate. *Corona* cupular, adnate to the column, spreading, fleshy, lobulate or toothed. *Column* minute, short, depressed; anther-tips short, inflexed; pollen-masses very minute, one in each cell, semi-ovate, compressed, inner margin pellucid, sessile, waxy, ascending. *Stigma* broadly conic, not exceeding the anthers.

I think it possible that the following species are abnormal forms of *Heterostemma.*

1. **O. urceolatus,** *Benth. in Hook. Ic. Pl.* t. 1191; leaves ovate or ovate-lanceolate acuminate base rounded or subcordate, cymes sessile or shortly peduncled, corolla ovoid-urceolate, corona 5-lobed, lobes incurved 3-toothed. Heterostemma urceolatum, *Dalz. in Hook. Kew Journ.* iv. 295; *Dalz. & Gibs. Bomb. Fl.* 153.

The CONCAN; Belgaum and hills to the north of it, *Dalzell.*

Stem purple. *Leaves* 2-4 by 1-2 in.; green, nerves 2-3 pair with strong connecting nervules. *Corolla* coriaceous, ¾ in. long, red-purple without, dark purple within, sparingly villous at the base within; lobes minute, triangular.

2. **O. disciflorus,** *Hook. f.*; nearly glabrous, leaves elliptic- or ovate-oblong subacute or obtuse, petiole 1-1½ in., corolla disciform vertically depressed, corona 5-lobed lobes entire margin very thick somewhat incurved.

WESTERN PENINSULA, the Concan? *Herb. Law.* and *Stocks.*

This in foliage entirely resembles *Heterostemma Dalzellii,* of which it may be a singular form, but the flowers are quite perfect (about ½ in. diam.)

3. **O. Beddomei,** *Hook. f.*; branches and petioles very pubescent, leaves ovate-cordate acuminate reticulately nerved, petiole 2-3 in., sepals lanceolate acuminate, corolla discoid.

MYSORE in the Beigoor forests, Wynaad, *Beddome.*

Described from an excellent drawing, Col. Beddome having lost his specimen.

43. DISCHIDIA, *Br.*

Herbs or undershrubs, usually rooting and climbing on trees or pendulous. *Leaves* various, fleshy, sometimes forming into pitchers (ascidia). *Flowers* very small or minute, white or red, in axillary fascicles umbels or racemes. *Sepals* 5, ovate, membranous. *Corolla* urceolate, mouth contracted; lobes 5, very short, valvate. *Coronal-scales* 5, membranous, adnate to the back of the column, erect, tips entire notched or 2-fid or with recurved arms. *Column* very short; anther-tip membranous; pollen-masses one in each cell, compressed, waxy. *Stigma* flat or conical. *Follicles* small, slender or thick, smooth, acuminate. *Seeds* minute, coma long.—DISTRIB. Species about 24; tropical Indian, Malayan, and Australian.

The species of *Dischidia* all want a careful study. They cannot be described satisfactorily from dried specimens. The leaves change in form, and it is not ascertained in respect of many species whether they may or may not be converted into pitchers (ascidia).

1. **D. Nummularia,** *Br. Prodr.* 461; glabrous, leaves subsessile ¼-¾ in. orbicular acute obtuse or apiculate, corolla scarlet, throat with a ring of hairs, follicles 1-1½ in. curved obliquely ellipsoid below the middle, above it contracted into a long slender beak. *Wall. Cat.* 4204; *Wight Contrib.* 43; *Dcne. in DC. Prodr.* viii. 632; *Blume Bijd.* 1059. D. orbicularis, *Dcne. l.c.* Collyris minor, *Vahl. in Act. Soc. Hafn.* vi. 111; *ex Wight Contrib.* 67.—*Rumph. Herb. Amboin.* v. t. 176, f. 1.

CACHAR, *Keenan,* and MALAY PENINSULA, from Chittagong, *Clarke,* Tenasserim and the Andaman Islands, to Singapore and Malacca, *Wallich,* &c. DISTRIB. Malay Islds., Australia.

A very slender herb, rooting on tree trunks. *Leaves* whitish when dry, with

often recurved margins, nerves 2–3 pairs horizontal reticulating. *Seeds* $\frac{1}{16}$ in. long, slender.

2. **D. hirsuta,** *Dcne. in DC. Prodr.* viii. 632; papillose and more or less pubescent, leaves $\frac{3}{4}$–1 in. sessile broadly ovate acute lacunose above between the horizontal nerves, corolla red, throat with 2 rows of hairs. D. fasciculata, *Dcne. l. c.* D. Brunoniana, *Griff. Notul.* iv. 44, and *Ic. Pl. Asiat.* t. 410, A. f. 1. Leptostemma hirsutum and fasciculatum, *Blume Bijd.* 1058.

TENASSERIM, *Helfer*; at Mergui, *Griffith*. SINGAPORE, *Hb. Wight*. MALACCA, *Maingay* (Kew Distrib. 1120). DISTRIB. Java.

Stem very slender and leaves on both surfaces papillose and sometimes sparsely hairy. *Leaves* pale when dry, the 2 or 3 pairs of nerves very prominent above. *Corolla* $\frac{1}{3}$ in. long "blood red, with a row of ascending shining hairs in the middle of the tube, and a similar row on the throat inserted below a row of 5 adnate fleshy convex scales. *Pollen-masses* linear, connate at the base." *Maingay.*

3. **D. albida,** *Griff. Notul.* iv. 46; glabrous, leaves petioled ovate or rounded-ovate or ovate-cordate acute or acuminate nerveless.

MALACCA; at Toondook. *Griffith.*

Stems very slender, creeping and rooting. *Leaves* fleshy; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. "*Peduncles* subaxillary equalling the petiole, perennial. *Flowers* umbelled, few, small, white. *Corolla*-throat closed with white hairs. *Pollen-masses* oblong, scarcely compressed, as long as their caudicles. *Follicles* very long-beaked, deeply channelled on the inner face." *Griffith.*

4. **D. khasiana,** *Hook. f.*; glabrous or very sparsely hairy, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. petioled orbicular tip rounded, nerves very slender, follicles $2\frac{1}{2}$ in. slender throughout straight or curved. Dischidia, *n.* 9, *Herb. H. f. & T.*

KHASIA MTS. at Churra and Nunklow, alt. 3–4000 ft. *J. D. H. & T. T.*

Stem very slender, creeping, papillose. *Leaves* quite orbicular, tip rounded or apiculate, nerves 2–3 pairs horizontal; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Follicles* about $\frac{1}{8}$ in. diam. below the middle, gradually tapering to the obtuse tip and to the base, pale.—This resembles *D. formosana*, Maxim., but the leaves are much larger; the habit and foliage are precisely those of *Hoya Nummularia.*

5. **D. benghalensis,** *Coleb. in Trans. Linn. Soc.* xii. 357, t. 15; glabrous, branches flagelliform pendulous, leaves linear elliptic obovate oblong or lanceolate midrib and nerves obscure or 0, flowers fascicled subsessile. *Wight Contrib.* 43; *Wall. Cat.* 4205; *Dcne. in DC. Prodr.* viii. 631; *Bot. Mag.* t. 2916. D. cuneifolia, *Wall. Cat.* 4206; *Dcne. l. c.* D. spathulata, *Blume Bijd.* 1069; *Miquel Fl. Ind. Bat.* ii. 513.

EASTERN NEPAL and SIKKIM, *J. D. H.* ASSAM and southwards to MALACCA.—DISTRIB. Java, Borneo.

Stems often matted, pale green, as thick as a goose-quill. *Leaves* in distant pairs, subsessile, 1–2 by $\frac{1}{4}$–$\frac{3}{4}$ in. obtuse acute or apiculate, very fleshy. *Flowers* minute. *Corolla* $\frac{1}{8}$ in. long, yellowish, tube globose, throat glabrous. *Follicles* $1\frac{1}{2}$–$2\frac{1}{2}$ in. slender, straight, acuminate, pericarp thin.

6. **D. Rafflesiana,** *Wall. Plant. As. Rar.* ii. 35, t. 142, and *Cat.* 4208; glabrous, climbing and pendulous, leaves orbicular 1 in. diam. subsessile changing into oblong pitchers 2–5 in. long, flowers umbellate on a long or short stout peduncle, sepals pubescent, corolla ovoid, teeth minute pubescent within, throat glabrous. *Griff. Notul.* iv. 47, t. 386, f. 6, and in *Trans. Linn. Soc.* xx. 387 and 396, t. 17, 18; *Dcne. in DC. Prodr.* viii. 632. Collyris major, *Vahl.*; *Wight Contrib.* 66.

CACHAR, *J. D. H. & T. T.*; and from TENASSERIM, *Griffith*, to MALACCA.—DISTRIB. Borneo, Australia.

Stem and branches stout. *Leaves* very similar to those of *D. hirsuta* when dry, but not papillose; ascidia irregularly compressed, obtuse, fleshy, base gibbous, the cavity filled with rootlets from the adjoining node. *Flowers* $\frac{1}{8}$ in long. *Sepals* obtuse. *Corolla* fleshy, teeth 3-gonous and throat thickened. *Follicles* 2–3 in. long, curved, $\frac{1}{3}$ in. broad below the middle, tapering thence to both ends, pericarp thin. *Seeds* $\frac{1}{10}$ in. linear oblong.—Griffith's Mergui plant may be different from the Malacca one, which has longer peduncles and more numerous flowers. I find no difference in the corollas.

7. **D. acutifolia,** *Maingay mss.*; glabrous, stems slender twining, leaves shortly petioled 3–4 in. long ovate-lanceolate acute coriaceous penninerved, peduncles elongate, flowers subsessile, corolla throat hairy.

MALACCA; *Maingay* (Kew Distrib. 1122).

Leaves shining, nerves 5–7 pair, prominent on both surfaces; petiole $\frac{1}{4}$ in. or less. *Peduncle* $\frac{1}{2}$–$1\frac{1}{2}$ in. "*Corolla* very minute, urceolate, pale yellow with the short limb pink, throat closed with a row of fine horizontal or slightly ascending hairs. *Coronal-processes* very minute, closely appressed to the anthers," *Maingay*. *Follicles* $2\frac{1}{2}$ in. long, very slender, terete, slightly curved, narrowed from the base upwards.

8. **D. Griffithii,** *Hook. f.*; glabrous, twining, leaves 1–$1\frac{1}{2}$ in. petioled obovate acute very fleshy nerveless, peduncles very short few-fld. D. obovata, *Griff. Notul.* iv. 51, and *Ic. Pl. Asiat.* t. 386, A. f. 7.

TENASSERIM; at Mergui, on trees, *Griffith*.

Branches as thick as a crow-quill. *Leaves* $\frac{3}{4}$–1 in. diam., base cuneate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Peduncles* perennial, ovoid, obtuse, as thick as the branch. "Flowers few, small, inconspicuous, white. *Sepals* minute, rounded. *Corolla* urceolate, 5-toothed, throat closed with hairs. *Coronal-processes* white, fleshy, angular, base 2-fid. *Pollen-masses* tumid, obovoid." *Griffith*.

9. **D. Collyris,** *Wall. Cat.* 4207; glabrous, leaves sessile orbicular 1–$1\frac{1}{2}$ in. diam. fleshy convex papillose with the nerves distinct beneath, corolla glabrous within white. Conchophyllum imbricatum, *Blume Bijd.* 1062; *Dcne. in DC. Prodr.* viii. 630. Collyris major, *Vahl.*; *Wight Contrib.* 66; *Miq. Fl. Ind. Bat.* ii. 513. ? D. albiflora, *Griff. Notul.* iv. 47, and *Ic. Pl. Asiat.* t. 410, A. f. 8.

MALACCA, *Maingay* (Kew Distrib. 1114). SINGAPORE, *Walker*.—DISTRIB. Java, Borneo.

Stems creeping and rooting, the roots protected by the leaves. *Leaves* sometimes pruinose beneath, nerves 2–3 pairs, horizontal. *Flowers* subsessile on the short peduncles. *Corolla* $\frac{1}{16}$ in. long, globose with erect teeth, "white glabrous within, lobes tipped with lilac," *Maingay*.

10. **D. coccinea,** *Griff. Notul.* iv. 45, and *Ic. Pl. Asiat.* t. 409; glabrous, leaves sessile orbicular $\frac{1}{2}$–$\frac{3}{4}$ in. diam. convex papillose with the nerves distinct beneath, corolla glabrous within scarlet.

MALACCA, *Griffith*, *Maingay* (Kew Distrib. 3780).

More slender and smaller than *D. Collyris*, of which Maingay considers it a variety. *Flowers* fascicled on a very short peduncle $\frac{1}{8}$ in. long. *Follicles* 1 in. long, lanceolate, curved, broadest near the base.

11. **D. complex,** *Griff. Notul.* iv. 50; glabrous, ascidia subreniform compressed lamina inflexed at the orifice, peduncle long, corolla white, throat closed with hairs.

MALACCA, *Griffith*.

Twining. *Ascidia* large; orifice small, near the petiole, its outer margin inflexed formed into a second pitcher much smaller than the outer one, opening on each side by an oblique aperture, deeply lobed or furrowed on the upper carinate on the lower side; outer cavity crammed with radicles, inner surfaces of both lurid purple.

Peduncles 3 in.; flowers subumbellate (in bud), white. *Corolla* subglobose. *Coronal scales* with very long narrow arms dilated at the tips; pollen-masses subobovate, caudicles much dilated—Description from Griffith.

DOUBTFUL SPECIES.

D. WALLICHII, *Wight Contrib.* 43; *Wall. Cat.* 8183; *Dcne. in DC. Prodr.* viii. 633; flowers and fruit unknown; is probably not a *Dischidia*.

D. CLAVATA, *Wall. Cat.* 4209, from Attran, is unknown to me; I have not found it in Wallich's Herbarium at the Linnean Society.

44. **HOYA,** *Br.*

Twining pendulous or rambling and rooting, rarely erect shrubs. *Leaves* opposite, thickly fleshy or very coriaceous. *Flowers* in axillary or terminal umbels. *Calyx* small, 5-partite. *Corolla* rotate, fleshy or waxy; lobes 5, often convex and spreading or reflexed, valvate in bud. *Coronal-scales* 5, large, membranous fleshy or horny, adnate to the column, stellately spreading or ascending, turgid or compressed laterally or vertically, often concave on the upper surface, margins usually recurved so as to enclose a hollow space, the inner angle often produced into a tooth or spur which is erect or incumbent on the anther. *Column* short; anthers conniving over the stigma, membranous, tips inflexed or erect, rarely 0; pollen-masses various, solitary in each cell, waxy, pedicelled, erect. *Stigma* included, flat or the centre apiculate. *Follicles* various, usually slender, acuminate, with a thin pericarp; rarely turgid with very thick walls. *Seeds* very small, ovate or linear-oblong; coma long. DISTRIB. Species about 60; tropical Asiatic, Malayan, and Australian.

A most difficult genus to describe from dried specimens. I am quite unable to adopt the sections established by Blume on the development of the coronal-processes. The description of the nervation of the leaves applies to herbarium specimens solely. The secondary nerves, and in most the primary, in perhaps all except *H. coriacea*, are invisible in the living plants, and there is no exact line to be drawn between those with 3–5 principal basal nerves, and those with alternate arched or straight, and more or less horizontal nerves. The peduncle is in very many species persistent and perennial, giving off a succession of flowers from tubercles towards its tip; the result is a cylindric thick end to the peduncle: it is not known whether this feature is common to all the species, nor even whether it is constant in any. The incurved or recurved form of the corolla probably affords a good character, but is lost in dried specimens. The coronal-processes are greatly distorted in drying, and the characters I have drawn from them must be accepted with reserve. The pollen-masses present great variations in size, form, and length of pedicels, and probably afford excellent characters. The follicles present wonderful variations, from the most slender and terete with thin pericarp of *H. globulosa*, to the thick cylindric with rounded lobed ends and excessively thick pericarp of *H. coronaria*. The seeds of all are very small for the Order.

SECT. I. **Crytoceras.** *Corolla* reflexed, lobes longer than broad. *Column* stipitate; coronal-processes very long, erect, with a long spur diverging from the base of each.

1. **H. multiflora,** *Blume Cat. Hort. Buit.* 49, and *Bijd.* 1064. H. coriacea, *Lindl. Bot. Reg.* 1839, t. 18, *not of Blume.* Crytoceras reflexum, *Benn. Fl. Jav.* 90, t. 21. C. floribundum, *Maund Botanist*, iv. t. 178. Centrostemma multiflorum, *Dcne. in Ann. Sc. Nat. Ser.* ii. ix. 272, and in *DC. Prodr.* viii. 634; *Blume Mus. Bot. Lugd. Bat.* i. 45; *Bot. Mag.* t. 5173. C. Lindleyanum, *Dcne. in DC. l. c.*

MALACCA; on Mt. Ophir, *Maingay*. PENANG (*drawing in Herb. Kew*).—DISTRIB. Java, Borneo, Philippine Islds.

Quite glabrous. *Stem* stout, climbing. *Leaves* 3–8 by $1\frac{1}{2}$ to 2 in., linear-oblong, acuminate, base acute; petiole $\frac{1}{2}$ in. *Umbels* terminal and axillary, very many-fld., peduncle 1–2 in.; pedicels slender, as long. *Sepals* small, oblong. *Corolla-lobes* $\frac{1}{3}$–$\frac{3}{4}$ in. long, tube bearded at the base. *Column* $\frac{1}{3}$ in. long. *Fruit* not seen.

SECT. II. **Pterostelma.** *Corolla* reflexed, lobes longer than broad. *Column* sessile, obconic; coronal-processes laterally compressed, semi-cordate, 2-winged, with an erect subulate point in the inner angle. PLOCOSTEMMA, *Bl.*

2. **H. acuminata,** *Benth. in Gen. Pl.* ii. 777. H. Griffithiana, *Dcne. mss.* Pterostelma acuminatum, *Wight Contrib.* 39; *Wall. Cat.* 8170; *Dcne. in DC. Prodr.* viii. 633.

KHASIA MTS.; alt. 2,000 ft., *Wallich*, &c.

Quite glabrous. *Stem* stout, 1–2 ft., subscandent and pendulous. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., elliptic-lanceolate, nerves obscure; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Umbels* terminal and axillary, few-fld.; peduncle $\frac{1}{2}$ in., pedicels 1 in. *Sepals* linear-oblong, obtuse, ciliolate. *Corolla-lobes* 1 in., glabrous, tube puberulous within. *Corona* shining. *Fruit* not seen.

SECT. III. **Ancistrostemma.** *Corolla* reflexed, lobes longer than broad. *Column* sessile; coronal-processes gibbous and 2-lamellate below, produced upwards into long erect points each with a 2-fid incurved hooked tip.

3. **H. Edeni,** *King in Herb. Hort. Calc.* Centrostemma sp., *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 3–6000 ft., *Herb. Griffith, J. D. H.*, &c.

Stem rather slender, climbing and rooting. *Leaves* 3–4 by 1–$1\frac{3}{4}$ in., elliptic- or obovate-lanceolate, obtusely caudate-acuminate, base acute, thinly coriaceous, puberulous or glabrate beneath; petiole $\frac{1}{10}$ in. pubescent. *Umbels* terminal; peduncles $\frac{1}{4}$–$\frac{1}{2}$ in., pedicels 1 in. *Sepals* small, ovate, obtuse. *Corolla* pubescent within; lobes $\frac{1}{3}$ in. long, subacute. *Coronal-processes* horny, deeply grooved down the back, much exceeding the anthers. *Follicles* 4 in. long, slender, straight. *Seeds* $\frac{1}{8}$ in. long.

SECT. IV. **Euhoya.** *Corolla-lobes* broader than long, spreading or recurved. *Column* sessile or subsessile; coronal-processes stellately spreading, inner angle acute or produced into an erect or recurved simple spine.

* Inflorescence terminal, or terminal and axillary.

† *Leaves terete.*

4. **H. linearis,** *Wall. in Wight Contrib.* 37, and *Cat.* 8155; ends of branches and umbels hirsute, leaves 1–2 in. cylindric terete acute, umbels terminal sessile many-fld., corolla glabrous or papillose within, coronal-processes horizontal. *Don Prodr.* 130; *Dcne. in DC. Prodr.* viii. 637.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3–6000 ft., *J. D. H.*, *Treutler.*

Stem pendulous, 1 ft. and more, flaccid. *Leaves* 1–2 by $\frac{1}{4}$ in. diam., straight, midrib glabrous or hirsute; petiole very short. *Pedicels* 1 in., and linear-oblong calyx hirsute. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., and corona white. *Follicles* $2\frac{1}{2}$ in., slender, straight, pericarp thin glabrous. *Seeds* $\frac{1}{8}$ in. long.—The following varieties are so identical in habit and inflorescence, that I cannot doubt their being conspecific. Wight's character is drawn from specimens sent him by Wallich consisting of leaves of one plant (*linearis*) and a detached flower of another, of which specimens (also detached) are fastened on Wallich's sheet of *linearis*, and which have glabrous pedicels and minute glabrous sepals; these may belong to another species.

VAR. *nepalensis*; corolla papillosely puberulous within, coronal-lobes ovate flattened above concave beneath.—Nepal.

VAR. *sikkimensis*; corolla glabrous within, coronal-lobes longer narrower subcylindric. *Bot. Ma*[illegible]82.—Sikkim.

5. **H. teretifolia,** *Griff. mss.*; quite glabrous, stem very slender creeping and rooting, leaves 5–7 in. very slender cylindric quite terete.

UPPER ASSAM; Patkoy hills, alt. 4000 ft., *Griffith.*

A very singular plant, mentioned under the above name by Griffith in his Journal (p. 69). The leaves, which are rather distant, are curved and (as dried) about $\frac{1}{8}$ in. diam. I have seen no flowers.

†† *Leaves flat.*

6. **H. lanceolata,** *Wall. in Wight Contrib.* 33, and *Cat.* 8164 and 8156 *b* (H. parviflora); nearly glabrous, leaves 1–2 in. subsessile lanceolate or ovate-lanceolate fleshy, umbels terminal, peduncles and pedicels stout puberulous, corolla puberulous within. *Don Prodr.* 130; *Dcne. in DC. Prodr.* viii. 637.

TROPICAL HIMALAYA; from Kumaon to Bhotan and KHASIA MTS., alt. 3–4000 ft.

Stem stout, climbing; branches long, pendulous. *Leaves* close set, somewhat elongate-trapezoid, base acute, midrib very obscure. *Umbels* 6–10-fld. *Sepals* oblong-lanceolate, pubescent. *Corolla* $\frac{1}{2}$ in. diam., lobes acute. *Coronal-lobes* ascending, short, thick, obtuse, terete, with a short flat area above, inner angle erect as long as the anther-tip. *Follicles* 5–6 in., very slender.

7. **H. Lobbii,** *Hook. f.*; quite glabrous, branches very stout, leaves 2–3 in. subsessile elliptic or ovate acute or acuminate very fleshy, nerves 6–8 pairs arched spreading, umbels terminal and axillary subsessile, corolla puberulous within, corona very large.

KHASIA MTS.; Nowgong, alt. 1500 ft, *Thos. Lobb.*

Branches as thick as a goose-quill, woody. *Leaves* 1–2 in. diam., base narrowly cordate; midrib rather slender. *Pedicels* 1 in. *Sepals* ovate-lanceolate, glabrous. *Corolla* purple, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., lobes subacute. *Coronal-processes* ascending, thick, terete, obtuse or subacute, inner angle raised acute as long as the anther tip.

8. **H. polyneura,** *Hook. f.*; quite glabrous, branches stout, leaves 3–4 in. subsessile rhombic-ovate or -lanceolate acuminate very fleshy, nerves very many oblique straight parallel, umbels axillary very shortly peduncled, corolla-lobes papillose within. Hoya, *No.* 29. *Herb. Ind. Or., H. f. & T.*

SIKKIM HIMALAYA; *Herb. Griffith*, alt. 3–5000 ft., *J. D. H., Clarke.*

Branches long, flexuous. *Leaves* very variable in breadth, broadest 1–2$\frac{1}{2}$ in the middle, base narrow but rounded; midrib slender, nerves very close. *Peduncle* at length thickened and scarred; pedicels slender. *Sepals* oblong, obtuse, glabrous. *Corolla* $\frac{1}{2}$ in. diam., white, disc glabrous. *Coronal-lobes* red-purple, very short, orbicular, flat above, inner angle produced upwards in some specimens into a stout, erect beak which equals the long subulate anther-tip, and downwards into 2 auricles; other specimens have a very short inner angle and short anther-tips. *Follicles* 4 in., slender, falcate, smooth. *Seeds* $\frac{1}{10}$ in. long, ovate-lanceolate.

** Flowers in axillary (rarely also terminal) umbels. (Solitary in *H. retusa.*)

† Corolla small, less than $\frac{1}{4}$ in. diam., revolute, villous within. Staminal column conical.

9. **H. parviflora,** *Wight Contrib.* 37; quite glabrous, leaves lanceolate acuminate very thick and fleshy, peduncles long slender, corolla revolute villous within, column conical. *Wall. Cat.* 8156 A; *Dcne. in DC. Prodr.* viii. 637.

TENASSERIM; Moulmein, *Wallich.*

Stem climbing, slender. *Leaves* 2$\frac{1}{2}$–4 by $\frac{1}{2}$–$\frac{3}{4}$ in.; petiole short, thick. *Peduncles* almost as long as the leaves; pedicels $\frac{1}{3}$ in., very slender. *Sepals* ovate, glabrous. *Corolla* $\frac{1}{8}$–$\frac{1}{4}$ in. diam. *Coronal-processes* membranous, united into a conical vertically 5-lobed column, each lobe again longitudinally folded and bifid at the spreading tip.

Follicles 4 in. long, very slender.—This approaches an unnamed Javanese species, but the leaves are more fleshy and the column different.

10. **H. revoluta,** *Wight mss.*; quite glabrous, leaves ovate or ovate-lanceolate acuminate very thick and fleshy, margins strongly recurved, peduncles long slender, corolla revolute villous within, column conical. H. ovalifolia, *Wall. Cat.* 8160 b.

MALACCA, *Griffith, Maingay* (Kew Distrib. 1127). SINGAPORE, *Wallich.*

Stem climbing. *Leaves* $1\frac{1}{2}$–3 in., midrib and nerves not visible, base acute; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., very thick. *Peduncle* equalling the leaves; pedicels very slender. *Sepals* ovate. *Corolla* $\frac{1}{8}$ in. diam., pink. *Coronal-processes* membranous, united into a conical vertically 5-lobed column, each lobed again, longitudinally folded and produced upwards into an acute point.

11. **H. micrantha,** *Hook. f.*; quite glabrous, leaves ovate or elliptic-lanceolate acute very thick and fleshy, margins flat, peduncle long or short, corolla revolute pubescent within, column conical.

TENASSERIM; Mergui, *Griffith.*

Stem rather stout. *Leaves* $2\frac{1}{2}$–4 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., midrib and nerves not visible; petiole very short. *Peduncle* shorter than the leaves; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., filiform. *Sepals* ovate, obtuse. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Coronal-lobes* lanceolate, suberect, outer angle 2-fid, back with a boss; anther-tip much longer than the process.

12. **H. lacunosa,** *Blume Bijd.* 1063; quite glabrous, leaves ovate or rounded-ovate acute base rounded margins thickened, nerves horizontal, peduncle stout, pedicels very short. *Miquel Fl. Ind. Bat.* ii. 525; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4826, 5272. Otostemma lacunosum, *Blume Mus. Bot.* i. 59, t. 11.

MALACCA; between Jarsing and Aya Bomboo, *Maingay.*—DISTRIB. Sumatra, Java, Borneo.

Stem slender, twining. *Leaves* 1–$1\frac{1}{2}$ in., very thick, but nerves distinct beneath, 3–5 pairs, base rounded; petiole very short. *Peduncle* longer than the leaves; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Sepals* very small, ovate, obtuse. *Corolla* $\frac{1}{6}$ in. diam., pubescent within. *Coronal-lobes* ovate, inner angle produced into an ovate obtuse lobe almost as large as the body, incumbent on the anther (which has no tip?).—This differs from the Javanese *H. lacunosa*, in the much larger inner produced angle of the coronal-processes.

†† Corolla $\frac{1}{2}$ in. diam. and upwards, rarely less; lobes usually spreading or incurved. Leaves flat in all.

a. Leaves very small, rarely more than 1 *in. long.*

13. **H. Nummularia,** *Dcne. mss.*; stem slender minutely rough, leaves very small orbicular shining, flowers many in very long-peduncled umbels.

KHASIA MTS.; at Moosmai, *Griffith.*

Stem creeping and rooting, angular (when dry). *Leaves* $\frac{3}{4}$ in. diam., shining and reticulate on both surfaces; petiole $\frac{1}{4}$ in., rather slender. *Peduncle* 2 in.; pedicels $\frac{1}{2}$–$\frac{2}{3}$ in. *Sepals* ovate-oblong. *Corolla* $\frac{1}{3}$ in. diam., "white, pubescent," *Griffith. Coronal-processes* too young for description.—Resembles *Dischidia khasiana.*

14. **H. serpens,** *Hook. f.*; stem very slender minutely rough, leaves very small suborbicular opaque papillose on both surfaces, flowers many on long peduncled umbels, corolla tomentose within, coronal-lobes ellipsoid.

SIKKIM HIMALAYA (*Herb. Griffith*).

Stem creeping and rooting. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., ovate or very broadly elliptic, base rounded or subcordate, nerves obscure; petiole very short, $\frac{1}{16}$–$\frac{1}{10}$ in. *Peduncle*

1½ in., stouter than the branch; pedicels 1 in. *Sepals* ovate. *Corolla* ½–⅔ in. diam., white, lobes obtuse.—Very similar to *H. Nummularia*, but the leaves are covered with minute papillæ (when dry).

15. **H. obcordata,** *Hook. f.*; stem very slender minutely rough and here and there hairy, leaves obcordate or obreniform.

Sikkim Himalaya; Chakoong, alt. 4–6000 ft., *J. D. H.*, Yoksun, *Clarke.*
Stem creeping and rooting. *Leaves* ¼ in. long, sometimes broader than long, lobes rounded, sinus acute, base rounded or subacute, rather thin, opaque, nerves obscurely reticulate; petiole $\frac{1}{16}$–$\frac{1}{10}$ in. *Flowers* in a drawing in Herb. Kew (by Jerdon) in a loose peduncled umbel; pedicels slender. *Corolla* ½ in. diam., white, lobes triangular with villous margins.—Possibly a form of *H. Nummularia* or *serpens*, but if so a very remarkable one.

16. **H. vaccinioides,** *Hook. f.*; quite glabrous, branches very long slender pendulous, leaves ½ in. elliptic subacute fleshy nerves obsolete.

Upper Assam; Mishmi Mts., by the Thumat river, *Griffith.*
Follicles 3 in. long, slender, straight, pericarp thin.

17. **H. bella,** *Hook. Bot. Mag.* t. 4402; stem petioles and peduncles pubescent, leaves 1 in. sub-bifarious ovate acute, peduncles very short, pedicels longer, sepals oblong ciliate. *Paxt. Magaz.* xv. t. 243; *Fl. des Serres,* iv. t. 399 (*copied from Bot. Mag.*).

Tenasserim; Taungkota mountain, Moulmein, *T. Lobb.*
Leaves deep green, recurved, nerveless when fresh, midrib strong beneath; petiole $\frac{1}{10}$ in. *Peduncle* ¼ in.; pedicels ¾ in. *Sepals* small. *Corolla* ¾ in. diam., pure white, glabrous within; lobes very short, subacute. *Coronal-processes* violet, boat-shaped, concave above, inner angle acute.—I have seen no specimens.

b. Leaves very narrow, lanceolate oblanceolate or linear, rarely 1 *in. broad: nerves invisible or very obscure.*

18. **H. retusa,** *Dalz. in Hook. Kew Journ. Bot.* iv. 294; quite glabrous, leaves very narrow gradually dilating from the base to the obcordate broad tip fleshy, flowers subsolitary, corolla puberulous within. *Dalz. & Gibs. Bomb. Fl.* 153.

The Concan; on the Ghats, *Dalzell*, &c.
Stem very slender. *Leaves* 1½–2 in. by ¼–⅓ at the broad tip, midrib very strong; petiole $\frac{1}{10}$–⅙ in. *Flowers* 1–3-nate; pedicels slender. *Sepals* minute, ovate. *Corolla* ¾ in. diam., white with a pink corona; lobes very broad, acute. *Coronal-lobes* horizontal, ovate, shorter than the corolla-tube, broad end outwards, inner angle acute.

19. **H. pauciflora,** *Wight Ic.* t. 1269 (*parviflora* in text); quite glabrous, leaves 1–2 in. linear-lanceolate obtuse very thick, peduncles very short few-fld., pedicels long slender, corolla glabrous within. H. Wightiana, *Thwaites Enum.* 199.

Malabar and Travancore; Cochin and Courtallam, *Wight.* Ceylon; central province, alt. 3–5000 ft., *Walker*, &c.
A very slender climber. *Leaves* rarely more than ¼ in. broad, margins often recurved; petiole $\frac{1}{10}$–⅙ in. *Peduncle* scarcely exceeding the petiole. *Sepals* small, narrow. *Corolla* ¾ in. diam., white. *Coronal-processes* pink, short, ovoid, obtuse, concave above, inner angle produced into a recurved spur.—I see no difference between the Ceylon and Deccan plants.

20. **H. longifolia,** *Wall. in Wight. Contrib.* 36; *Cat.* 8154; glabrous, leaves 4–8 in. narrowly oblanceolate acuminate very fleshy, peduncle long or short smooth and pedicels glabrous, corolla glabrous margins pubescent,

coronal-processes horizontal. *Dcne. in DC. Prodr.* viii. 627; ? H. Shepherdii, *Hook. Bot. Mag.* t. 5269.

TROPICAL HIMALAYA; from Kumaon to Sikkim, alt. 1–3000 ft. KHASIA MTS., alt. 3–4000 ft., *Griffith*, &c.

Stem stout, climbing; branches long, pendulous. *Leaves* very variable in breadth, $\frac{1}{2}$–$1\frac{1}{4}$ in., midrib obscure, base narrow acute or rounded; nerves hardly visible, very oblique almost parallel to the midrib; petiole very stout, $\frac{1}{4}$–1 in. *Peduncle* sometimes 2 in.; pedicels 1–$1\frac{1}{2}$ in. *Sepals* ovate, acute, glabrous. *Corolla* $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., lobes subacute. *Coronal-processes* broadly ovate, flat above with a central boss, convex beneath; inner angle acute, shorter than the broad anther-tips. *Follicles* 4–6 in., slender, straight. *Seeds* $\frac{1}{8}$ in., lanceolate.

21. **H. oblanceolata,** *Hook. f.*; glabrous, leaves 4–6 in. narrowly oblanceolate acuminate very fleshy, peduncles very short and thick and pedicels glabrous, corolla puberulous within, coronal-processes sub-erect.

KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T.*

Stem, stout, climbing. *Leaves* as in *H. longifolia*, but smaller. *Peduncles* $\frac{1}{4}$–1 in., clavate or cylindric, when old $\frac{1}{8}$–$\frac{1}{4}$ in. diam. and densely scarred; pedicels slender. *Sepals* ovate, acute. *Corolla* $\frac{1}{2}$ in. diam., pale flesh-coloured. *Coronal-lobes* broadly oblong or subspathulate, inner angle produced into a short obtuse lamella which is much shorter than the subulate anther tip.

c. *Leaves broad, ovate oblong elliptic or lanceolate, strongly 3–5-nerved from the base to the middle or higher.*

22. **H. latifolia,** *G. Don. Gen. Syst.* iv. 127; glabrous, leaves 5–10 in. ovate or oblong-ovate acute or acuminate very thick shining 5-nerved margins recurved, peduncles solitary or fascicled very thick, pedicels very short puberulous, flowers small, coronal-processes shorter than the corolla-tube. *Dcne. in DC. Prodr.* viii. 638. H. macrophylla, *Wight Contrib.* 38, *not of Blume.* H. polystachya, *Blume Mus. Bot.* i. 45, t. 9.

PENANG, *Wallich.* SINGAPORE, *Maingay.*—DISTRIB. Java.

Stem very stout. *Leaves* variable in breadth, 3–5 in., base rounded or cordate, petiole very short and thick. *Peduncles* 1–2 in., at length cylindric and covered with raised pitted tubercles *Sepals* minute, ovate. *Corolla* $\frac{1}{8}$ in. diam., pubescent within. *Coronal-processes* suberect, ovoid, apiculate, upper surface flattened, inner angle acute, under surface deeply grooved.

23. **H. parasitica,** *Wall. in Wight Contrib.* 37, and *Cat.* 8159; glabrous, leaves 3–5 in. ovate elliptic or lanceolate acute or acuminate 3–5-nerved, peduncles solitary or in pairs short or long slender or stout, pedicels slender long glabrous, coronal-processes longer than the corolla-tube. *Wight Ic.* t. 587; *Dcne. in DC. Prodr.* viii. 637. H. Hookeriana, *Wight Contrib.* 37; *Wall. Cat.* 8153; *Dcne. l. c.* 636. Hoya sp. *Wall. Cat.* 8153. H. pallida, *Lindl. in Bot. Reg.* t. 951; *Paxt. Fl. Gard.* t. 26, *copied in Lemaire Jard. Fleur.* t. 64. Asclepias parasitica, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 42.

ASSAM; Conulla, *Clarke.* KHASIA MTS. ascending to 2000 ft. SUNDERBUNDS, and from CHITTAGONG to SINGAPORE, MALACCA and the ANDAMAN ISLDS.

A tall climber, stem stout or slender. *Leaves* extremely variable in length and breadth, much the largest in Khasian specimens, nerves obscure; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., very thick. *Peduncles* 1–3 in., slender or stout and becoming much thickened and scarred; pedicels $\frac{3}{4}$–1 in. *Sepals* small, ovate. *Corolla* $\frac{1}{2}$ in. diam., pearly white; lobes glabrous within, always inflexed in dried specimens with the coronal-processes projecting between them; these are ascending, ovate, acute, concave with a mesial ridge above, with the narrow end outwards, and the inner angle very short, white, pink at the junctures.—I have seen no fruit. Except in the large leaves, sometimes 9 in. long, I can find no character for *H. Hookeriana. H. cinnamomifolia*, Hook. Bot.

Mag. t. **4347**, has very similar flowers and leaves. Lindley figures the flower of *H. pallida* as nearly white, Paxton both figures and describes them as yellow.

d. Leaves elliptic, oblong, or linear-oblong, penni-nerved, nerves very horizontal (sometimes oblique in H. Griffithii).

24. **H. fusca**, *Wall. Pl. As. Rar.* i. 68, t. 75, and *Cat.* 8157; glabrous, leaves 6–9 in. linear-oblong acuminate fleshy midrib very thick, peduncles short and pedicels very stout, corolla pubescent within. *Wight Contrib.* 37; *Dcne. in DC. Prodr.* viii. 639.

NEPAL, *Wallich*; SIKKIM, alt. 1–4000 ft. KHASIA MTS. and PEGU.

A stout climber. *Leaves* 1½–2½ in. diam., sides nearly parallel; nerves numerous, quite horizontal; petiole thick, ½–1 in. *Peduncles* sometimes terminal, ½–1 in., pedicels as long. *Sepals* broadly ovate, obtuse. *Corolla* ½ in. diam., yellow-brown, lobes spreading. *Coronal-processes* short, very thick, obtuse, concave above, inner angle ending in an erect or recurved spur as long as the anther-tip. *Follicles* 4–5 in. long by ⅓ in. diam., rather thick-walled, straight. *Seeds* ⅛ in. long.

25. **H. obtusifolia,** *Wight Contrib.* 38; more or less puberulous, stem very stout, leaves 4–6 in. oblong rounded at both ends or tip acute or apiculate very thick, margins flat, midrib stout, peduncle stout, pedicels and calyx pubescent, corolla coriaceous pubescent without glabrous within. *Wall. Cat.* 8167; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4969 (*excl. syn. H. velutina*). H. Teysmanniana, *Miquel Fl. Ind. Bat.* 522.

TENASSERIM OR ANDAMAN ISLDS., *Helfer*. PENANG? *Wallich.*—DISTRIB. Sumatra, Java.

Branches as thick as the little finger or less. *Leaves* 1½–2½ in., broad, shining, nerves visible only when dried; petiole very thick, ½–1 in. *Peduncle* 1–3 in., at length terminating in a cylindric mass of scarred close set tubercles; pedicels ½–1 in. *Sepals* large for the genus, oblong, obtuse, coriaceous. *Corolla* dull yellow, 1½ in. diam.; lobes erect, acute. *Coronal-processes* short, obtuse, suberect, concave in fruit, inner angle ending in an erect or recurved spine longer than the anther-tip. *Follicles* not seen.

26. **H. coronaria**, *Blume Bijd.* 1063, and *Rumph.* iv. 31, t. 182, f. 2 and t. 104; leaves 3–4 in. elliptic or elliptic-ovate abruptly acuminate very thick pubescent beneath, base rounded, margins recurved, peduncle stout and pedicels large, sepals pubescent, corolla coriaceous pubescent without glabrous within, follicles very thick. *Miquel Fl. Ind. Bat.* ii. 516. H. velutina, *Wight Contrib.* 35; *Wall. Cat.* 8150. *Dcne. in DC. Prodr.* viii. 635.

MALACCA, *Griffith, Maingay* (Kew Distrib. 1125), PENANG, ? *Wallich.*—DISTRIB. Sumatra, Borneo.

Stem stout, twining; young shoots, petioles, leaves beneath and inflorescence finely tomentose. *Leaves* 1–2 in. diam., nerves very obscure; petiole thick, ¼–½ in. *Peduncles* ½–1 in., pedicels as long. *Sepals* rounded, thick. *Corolla* 1–1½ in. diam., thick, "cream white or yellowish speckled with purple," *Maingay*; lobes erect or incurved. *Coronal-processes* small, waxy, white, nearly hemispherical, very concave above and convex beneath, the inner angle shortly horizontally produced, obtuse. *Follicles* 6–8 in. long by 1½–2 in. diam., subcylindric, obtuse, base gibbous, walls very thick, endocarp hard. *Seeds* ¼ in. long.—The smaller shorter leaves with revolute margins distinguish this at once from *H. obtusifolia*; Wallich's habitat of Silhet is probably an error for Penang, from which island there is a drawing of this species in Herb. Kew. Perhaps two species mixed here, a purple- and white-flowered.

27. **H. elliptica**, *Hook. f.*; glabrous, leaves 1½–2½ in. elliptic obtuse at both ends thin in texture nerves very prominent, peduncle very short, pedicels long slender, sepals very small, corolla glabrous without puberulous within.

MALACCA, *Maingay* (Kew Distrib. 1137).

Stem rather slender, twining. *Leaves* 1–1½ in. diam., intramarginal nerve very distinct; petiole ⅛–¼ in. *Peduncles* ½ in., pedicels 1–1½ in. *Sepals* ovate, obtuse, puberulous. "*Corolla* white," *Maingay*; lobes obcordate, apiculate, inflexed (when dry). *Coronal-processes* longer than the corolla-tube, suberect, laterally subcompressed, ovate-oblong, obtuse, upper (inner) surface grooved, inner angle produced into a short subulate erect point.

28. **H. Griffithii**, *Hook. f.*; glabrous, leaves 6–9 in. narrowly oblanceolate or linear-oblong acute or acuminate very thick, nerves nearly horizontal, peduncle long stout, sepals large coriaceous, corolla 1½ in. diam. glabrous within.

KHASIA MTS., *Griffith*; Nowgong, alt. 2–4000 ft. *J. D. H. & T. T.*

A stout climber. *Leaves* distant, 1–2 in. diam., midrib stout, nerves quite obscure in some, in others distinct and forming large areoles; petiole ½–1 in., very thick. *Peduncle* 2–4 in., as thick as the branch; pedicels 1–1½ in., very stout. *Sepals* ¼–⅓ in., oblong, obtuse, coriaceous. *Corolla* purple? glabrous within, lobes acute. *Coronal-processes* produced upwards from a suborbicular base into an erect stiff obtuse spur as long as the anther-tip, the orbicular base is 2-lamellate below.—In the large calyx this approaches *H. coronaria*. It has been flowered at Fallowfield (Manchester) by Mr. Swan.

29. **H. imperialis**, *Lindl. in Bot. Reg.* 1846, t. 68 *in note, and in Journ. Hort. Soc.* v. 80, *with woodcut*; leaves 6–9 in. elliptic or linear-oblong obtuse apiculate very thick puberulous or glabrate beneath, peduncles and pedicels long stout, sepals rounded-ovate, corolla 2½–3 in. diam., follicles stout woody. *Hook. Bot. Mag.* t. 3397, *copied in Fl. des Serres*, iv. t. 393, 394; *Ann. de Gand*, 1848, t. 228. ? H. speciosa, *Dcne. in DC. Prodr.* viii. 635. ? Asclepias Sussuela, *Roxb. Fl. Ind.* ii. 31, *excl. syn.*

MALACCA, *Maingay*.—DISTRIB. Borneo, ? Amboyna.

A lofty stout climber. *Leaves* 1½–2½ in. diam., rarely acute, shining, base often narrowed and cordate, midrib very stout, nerves quite horizontal; petiole ¼–½ in. *Peduncles* 3–10 in.; pedicels 2–3, and sepals pubescent. *Corolla* leathery, dull purple, puberulous near the corona, lobes triangular acute. *Coronal-processes* white, laterally compressed, erect, turgid, obtuse, inner angle shortly produced into a subulate point. *Follicles* 9 in. long. by 1½ in. diam., straight, lanceolate, finely acuminate, pubescent; pericarp thickly coriaceous, endocarp hard. *Seeds* ¼ in. long.

30. **H. Wightii**, *Hook. f.*; quite glabrous, leaves 3–4 in. long-petioled elliptic or elliptic-lanceolate rarely orbicular acute at both ends thick, margins recurved, nerves distinct horizontal or nearly so, peduncles much shorter than the pedicels, sepals linear-oblong, follicles slender. H. pendula, *Wight & Arn. Contrib.* 36 (*excl. syn.*); *Dcne. in DC. Prodr.* viii. 635; *Grah. Cat. Bomb. Fl.* 119. H. pallida, *Dalz. & Gibs. Bomb. Fl.* 152.—Hoya, n. 27, *Herb. Ind. Or. H. f. & T.*

DECCAN PENINSULA; from the Bombay Ghats to the Nilgherry Mts.

A stout climber. *Leaves* 1¼–2 in. broad, margins often revolute, tip obtuse often produced, nerves loosely netted; petiole ½–1 in. *Peduncles* ⅛–¼ in.; pedicels stout, 1 in. *Sepals* glabrous. *Corolla* ½–¾ in. diam., cream-coloured, glabrous within, margins puberulous. *Coronal-processes* ascending, short, inflated, obtuse, concave above, inner angle produced into a short erect spur. *Follicles* 4 in. long, slender, straight, pericarp thin.—For the distinctions between this and *H. ovalifolia* see the latter plant. The vars. *Rheedei* and *nilgherrensis*, Wight, are not distinguishable.

e. *Leaves orbicular ovate-oblong or broadly elliptic, rarely lanceolate, penninerved, nerves arching* (*not prominently* 3–5-*nerved from the base*). See also *H. polyneura* and *H. Lobbii*.

31. **H. caudata,** *Hook. f.*; glabrous, leaves ovate acuminate very shortly petioled very thick margins corrugate, pedicels short filiform, corolla pubescent within lobes tailed.

MALACCA, *Maingay* (Kew Distrib. 1128).

Stem rather slender but woody. *Leaves* 2–3 in. diam., sparsely papillose on both surfaces, midrib and arching nerves faint; petiole ⅛ in., so thick as to appear globose. *Peduncle* (one only seen) nearly 2 in., with a thickened scarred tip; pedicels ½ in. *Sepals* linear-lanceolate, glabrous. *Corolla* ½–¾ in. diam., "white, suffused with pink," *Maingay*; lobes triangular, ending in slender tails of their own length. *Coronal-processes* horizontal, elliptic-ovate, broadest end outwards, concave above, inner angle produced into a long subulate spur, which is much shorter than the very long filiform anther-tips.

32. **H. Arnottiana,** *Wight Contrib.* 36; quite glabrous, leaves 3–8 in. elliptic or lanceolate thick acute or acuminate, nerves distinct, peduncles long or short stout, pedicels long, corolla glabrous within, coronal-processes large exceeding the tube. *Wall. Cat.* 8161; *Dcne. in DC. Prodr.* viii. 638.—Hoya n. 38, *Herb. Ind. Or. H. f. & T.*

TROPICAL HIMALAYA; Nepal, *Wallich.* SIKKIM; alt. 1–3000 ft., *J. D. H.* UPPER ASSAM; Suddya, *Griffith.*

A lofty climber. *Leaves* very variable, 2–4 in. diam.; petiole ½–1 in. *Peduncle* 1–3 in.; pedicels 1 in. *Sepals* broadly ovate, obtuse. *Corolla* ¾ in. diam., scarcely papillose within, cream-coloured, lobes spreading, subacute. *Coronal-processes* white, ovate, subacute with the narrower end outwards, concave above, inner angle acute, shorter than the anther-tip.

33. **H. ovalifolia,** *Wight & Arn. Contrib.* 37; quite glabrous, leaves 2–4 in. elliptic or elliptic-ovate or -oblong or -lanceolate obtuse or acute very thick, nerves distinct, peduncles and pedicels stout, corolla glabrous within, coronal-processes exceeding the tube. *Wight Ic.* t. 847 (*not good*); *Wall. Cat.* 8160 *a*; *Dcne. in DC. Prodr.* viii. 638; *Thwaites Enum.* 198; *Paxt. Fl. Gard.* t. 23, *copied in Lemaire Jard. Fleur.* t. 64, f. 2.

NILGHERRY MTS. and MANGALORE, *Wight.* CEYLON, in the Ambagamowa district, *Walker*, &c.

Stem slender. *Leaves* often subfascicled, 1–1½ in. broad, very variable, acute at both ends; petiole ⅛–¼ in. *Peduncle* short; pedicels ½–¾ in. *Sepals* ovate, obtuse, glabrous. *Corolla* ⅓–½ in. diam., pale straw-coloured; lobes broad acute. *Coronal-processes* ovate, obtuse, broader end inwards, concave above, inner angle cuspidate. *Follicles* 5–6 in., very slender, curved, pericarp thin.—The arching nerves, flat leaf-margins and large corona distinguish this from *H. Wightii.*

34. **H. globulosa,** *Hook. f. in Gard. Chron.* 1882, ii. 732, f. 115; more or less hairy, leaves 5–7 in. long-petioled elliptic or oblong cuspidate or acuminate base rounded midrib very stout, nerves distinct, peduncle long, pedicels villous, corolla nearly glabrous within. *Floral Magazine*, 1860, t. 406.—Hoya n. 30 and 33; *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 1–3000 ft., *J. D. H.*, *Clarke.* ASSAM; Muku hills, *Simmonds.* CACHAR, *Keenan.* CHITTAGONG; at Seetakoond. *J. D. H. & T. T.*

A stout climber, more or less hairy, the hairs long but very deciduous. *Leaves* 2–3½ in. diam., much like those of *H. fusca*, but with arching nerves; petiole ½–1 in. *Peduncle* 3–4 in.; pedicels 1 in. *Sepals* rounded. *Corolla* ½ in. diam., cream-coloured; lobes short, incurved. *Coronal-processes* short, broadly elliptic, pink, concave above, inner angle produced into an erect spur which is shorter than the large broad anther-tips. *Follicles* 12–16 in. long, very slender, cylindric, pericarp thin. *Seeds* ½ in. long, slender.

35. **H. Thomsoni,** *Hook. f.*; petioles and leaves beneath sparsely pilose, leaves 2–3 in. oblong or obovate-oblong acuminate very thick, umbels axillary, peduncle short puberulous tip at length thickened and scarred, corolla-lobes with fringed margins glabrous or pubescent within.—Hoya, *n.* 12, *H. f. & T.*

KHASIA MTS.; Churra, alt. 3–4000 ft., *J. D. H. & T. T.*

Stem slender, rooting. *Leaves* not very fleshy, $\frac{2}{3}$–$1\frac{1}{2}$ in. broad, midrib obscure, base obtuse or rounded, nerves very faint, arched; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncle* $\frac{1}{2}$–1 in., pubescent; pedicels glabrous or sparsely puberulous. *Sepals* glabrous, ovate, acute. *Corolla* $\frac{1}{2}$ in. diam., lobes acute. *Coronal-processes* obovate with the broad end outwards, concave above with a boss, inner angle produced into a short erect spur as long as the anther-tip.—The pubescence of the leaves is very obscure in dried specimens.

36. **H. diversifolia,** *Blume Bijd.* 1064; quite glabrous, leaves 2–3 in. broadly obovate or elliptic obtuse or apiculate very thick margins recurved, nerves indistinct, peduncles and short pedicels stout, corolla puberulous within, follicles very thick. *Miquel Fl. Ind. Bat.* ii. 518; *Dcne. in DC. Prodr.* viii. 637. H. orbiculata, *Wall. in Wight Contrib.* 36; *Wall. Cat.* 8151; *Dcne. l. c.* —Sussuela esculenta, *Rumph. Herb. Amb.* v. 467, t. 175, f. 2.

BURMA; at Prome, *Wallich.* MALACCA, *Maingay* (Kew Distrib. 1130).—DISTRIB. Java, Amboyna.

A stout climber. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in. diam., base acute or rounded, nerves arched; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncle* $\frac{1}{4}$–$\frac{1}{2}$ in., very thick; pedicels about $\frac{1}{2}$ in. *Sepals* small, elliptic, obtuse, glabrous (ciliate, *Maingay*). *Corolla* $\frac{1}{2}$ in. diam., cream-coloured; lobes broad. *Coronal-processes* pale pink, short, thick, ovate, with the broad end outwards concave above, with a boss near the centre, inner angle produced into a short, erect spur shorter than the anther-tip. *Follicles* 6 in. long., $\frac{3}{4}$ in. diam., falcate, sublinear; pericarp thick, apparently $\frac{1}{4}$ in. or more. *Seeds* about $\frac{1}{4}$ in. long.

37. **H. coriacea,** *Blume Bijd.* 1063; *Rumphia,* iv. t. 187; nearly glabrous, leaves 3–5 in. long-petioled elliptic or oblong or obovate-oblong acute or acuminate thinly coriaceous reticulated, base rounded, midrib and slender nerves very distinct, peduncles and pedicels long, sepals linear pubescent, corolla villous within. *Miquel Fl. Ind. Bat.* ii. 521; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4518, *copied in Fl. des Serres,* t. 578; *Paxt. Fl. Gard.* i. f. 55; *Lemaire Jard. Fleur.* t. 37. H. Brunoniana, *Wight Contrib.* 37; *Wall. Cat.* 8163; *Dcne. l. c.* 636.

PENANG, *Wallich.* MALACCA, *Griffith, Maingay* (Kew Distrib. 1131, 1134).—DISTRIB. Java, Borneo.

A stout climber. *Leaves* variable, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, shining above, far more thin than in any Indian congener; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Peduncle* 2–5 in.; pedicels $\frac{3}{4}$–1 in. *Sepals* as long as the corolla-tube. *Corolla* $\frac{3}{4}$ in. diam., dirty straw-coloured or reddish; lobes incurved when dry. *Coronal-processes* white, ovoid, inflated, subacute, the narrow end outwards, inner angle cuspidate shorter than the anther-tip, "pollen-masses very slender, with trigonous pedicels and minute corpuscles," *Maingay.*—The comparatively membranous leaves with conspicuous reticulate nervation, unlike that of *Hoya,* at once distinguish this species.

38. **H. pendula,** *Wight Ic.* t. 474 (*not of Contrib.*); branchlets and umbels sparsely hairy, leaves $1\frac{1}{2}$–3 in. elliptic-ovate or -lanceolate acute thick nerves distinct, margins recurved, peduncles short, pedicels longer, sepals lanceolate, corolla-lobes silkily villous. *Dalz. & Gibs. Bomb. Fl.* 152. Asclepias pendula, *Roxb. Fl. Ind.* ii. 36.

DECCAN PENINSULA; the Circars, *Roxburgh*; Western Ghats, and the Concan, *Nimmo*; Nilgherry hills, *Wight.*

Stem rather slender, hairiness very inconspicuous. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in. diam., like those of *H. ovalifolia,* but margins recurved when dry, base narrow or rounded;

petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* $\frac{1}{3}$–$\frac{3}{4}$ in.; pedicels 1–1$\frac{1}{2}$ in. *Sepals* shorter than the corolla-tube. *Corolla* $\frac{2}{3}$ in. diam., white. *Coronal-processes* (mutilated) as long as the corolla-tube, apparently ovate, with the inner angle shortly spurred.—The only specimen I have seen is an unnamed one in Wight's Herbarium; the plate in his Icones is a copy of Roxburgh's drawing, which represents a much larger leaved plant than the specimen.

39. **H. Maingayi,** *Hook. f.*; quite glabrous, leaves 7–8 in. elliptic-lanceolate or oblanceolate finely acuminate very thick nerves reticulate distinct very oblique, peduncle very short thick, pedicels longer, sepals small obtuse, coronal-processes longer than the villous corolla-tube.

MALACCA, *Maingay* (Kew Distrib. 1136).

Stem stout. *Leaves* 2$\frac{1}{2}$–3$\frac{1}{2}$ in. diam. at or above the middle, reticulate on both surfaces, base narrow; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., very thick. *Peduncle* $\frac{1}{3}$–1 in., thickened and scarred; pedicels 1 in. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., pale pink, lobes short, obtuse. *Coronal-processes* ovate, acute, narrow end outwards, above concave with a mesial ridge, inner angle apiculate shorter than the anther-tip.

DOUBTFUL AND EXCLUDED SPECIES.

H. CRASSIFOLIA, *Haw. Succ. Pl. Suppl.* 8; *Dcne. in DC. Prodr.* viii. 640. Scholera crassifolia, *Jacq. Eclog.* t. 2; *Traill. in Trans. Hort. Soc.* vii. 22; from India; with leaves described as excessively thick, obsoletely spotted, petals truncate or obtuse, is unknown. Wight (*Contrib.* 38) refers it to the Chinese *H. carnosa*, Br., which name it would supersede.

H. FINLAYSONII, *Wight Contrib.* 38; *Wall. Cat.* 8166; *Dcne l. c.*; stem stout, leaves 5–7 by 2 in. ovate-lanceolate obtusely acuminate densely thick penni-nerved, nerves prominent on both surfaces arched, intramarginal very distinct, petiole short stout.—Singapore, *Wallich*; Siam,? *Herb. Finlayson.*

H. GYMNANTHERA, *Wight. Contrib.* 37; Wallich's sheet of this consists of a leafless twig of a Hoya with buds, and a good specimen of *Parsonsia spiralis.*

H. NICOBARICA, *Br. in Wight Contrib.* 36 (note under *H. pendula*, W. & A.); *Dcne. l. c.*—Nothing is known of this.

H. OPPOSITA, *Don Gard. Dict.* iv. 128 (Sperlingia opposita, *Vahl*; *Wight Contrib.* 67), is H. Rumphii, *Blume*, a Moluccan plant.

H. WALLICHIANA, *Dcne. l. c.* 635; said to be mixed with Wallich's n. 8165 (*H. latifolia*), appears from Decaisne's description to be *H. coronaria*, Bl.

H. VERTICILLATA, *G. Don Gard. Dict.* iv. (Sperlingia verticillata, *Vahl. Skrivt. Naturhist. Selsk. Kiobenh.* vi. 113), said to be a native of India, is unknown to me.

H. SP.? Amongst the drawings in Herb. Kew is one of a *Hoya* from Penang, with ovate-lanceolate acuminate 3-ple nerved leaves 6 in. long suffused with purple, red and white flowers $\frac{1}{2}$ in. diam. having long flexuous hairs on the corolla, the corolla-lobes are obtuse and the coronal-processes red.

45. PHYSOSTELMA, *Wight.*

A twining glabrous shrub. *Leaves* opposite, coriaceous, shining. *Flowers* large, umbelled. *Sepals* small, narrow. *Corolla* cup-shaped, lobes very short. *Coronal-processes* 5, very large, ovoid-oblong, obtuse, adnate to the anthers, spreading and ascending; margins reflexed. *Column* very small; anthers conniving over the stigma, tips inappendiculate; pollen-masses one in each cell, ovoid-oblong, erect. *Stigma* flat. *Follicles* long, cylindric, smooth. *Seeds* comose.

P. Wallichii, *Wight Contrib.* 40; *Wall. Cat.* 8171; *Dcne. in DC. Prodr.* viii. 633. P. campanulatum, *Dcne. l. c.* Hoya campanulata, *Blume Bijd.* 1064; *Bot. Reg.* 1847, t. 54; *Bot. Mag.* t. 4545. Cystidianthus campanulatus, *Hassk. Cat. Hort. Boj.* 126; *Blume Mus. Bot.* i. 57.

SINGAPORE; *Wallich.*—DISTRIB. Java?

Leaves 3–5 by 1¼–2½ in., elliptic-oblong, acuminate, coriaceous, nerves reticulate; petiole ¼ in. *Cymes* globose, 3–4 in. diam.; peduncle 1–2 in., stout; pedicels as long, slender. *Corolla* 1–1¼ in. diam., pale yellow, lobes apiculate. *Column* ⅓ in. diam., the radiating coronal-processes narrowly oblong, horny and yellow when dry.

46. PYCNORHACHIS, *Benth.*

A hairy twining undershrub. *Leaves* opposite, very shortly petioled, membranous, villous. *Flowers* black-purple, in reflexed pairs spirally disposed round the long fleshy branches of an axillary racemiform cyme. *Sepals* subulate. *Corolla-tube* short, thick, throat annulate; lobes elongate, subulate-lanceolate from a broad base, hairy within, valvate in bud. *Coronal-scales* 5, spreading at the base of the column opposite the anthers. *Column* short, adnate to the middle of the corolla-tube; anther-tip long, subulate, hyaline; pollen-masses one in each cell, long, slender, shortly pedicelled, cylindric, waxy, erect. *Ovary* sunk in the calyx-tube; stigma obtusely conical, 5-angled, much shorter than the anther-tips; ovules many. *Follicles* curved, cylindric, obtuse, glabrous. *Seeds* comose.

P. Maingayi, *Hook. f.*

MALACCA; very rare, *Maingay.*

Branches hispidly hairy. *Leaves* 4–6 by 1½–2 in., oblong-obovate, acuminate, villous on both surfaces, base narrowly cordate or 2-lobed at the insertion of the petiole; nerves 10–12 pair, spreading; petiole ¼–½ in., villous. *Cymes* 3–6 in. long, branches few, ⅓ in. diam. *Corolla* ⅓ in. long, dark purple; annules of throat fringed with hairs. *Corpuscle* slender. *Follicles* 5 in. long by ¾ in. diam., sickle-shaped.—Description chiefly from that and the drawings of the discoverer of this very curious genus, which resembles no other.

TRIBE V. CEROPEGIEÆ.

47. LEPTADENIA, *Br.*

Erect, rigid, almost leafless, or twining, hoary or glabrous, leafy shrubs. *Leaves* elliptic or ovate-cordate. *Flowers* small, in crowded axillary umbelliform cymes. *Calyx* turbinate, shortly 5-lobed. *Corolla* rotate; lobes pubescent or bearded, margins recurved, valvate in bud. *Corona* double, corolline of 5 scales between the corolla-lobes; staminal of a raised undulate wing at the base of the anthers. *Column* short; anthers inflexed, obtuse, tips appendiculate; pollen-masses one in each cell, globose, sessile, erect, tips pellucid. *Stigma* included, flat, 5-gonal, 2-cuspidate. *Follicles* rigid, acuminate, smooth. *Seeds* comose, flat, winged.—DISTRIB. Species 12; tropical Asia and Africa.

1. **L. reticulata**, *Wight & Arn. Contrib.* 47; twining, leafy, leaves ovate-cordate or elliptic acute glabrous or hoary beneath, cymes peduncled hoary. *Wight Ic.* t. 350; *Wall. Cat.* 8197; *Dcne. in DC. Prodr.* viii. 628. L. appendiculata, *Dcne. l. c.* L. imberbe, *Wight Contrib.* 48; *Wall. Cat.* 8198. L. brevipes, *Wight Cat.* 1536; *Dcne. l. c.* Cynanchum reticulatum, *Retz. Obs.* ii. 15. C. asthmaticum, *Herb. Ham.* ? C. ovatum, *Thunb.*; *Dcne. l. c.* 548. Secamone canescens, *Sm. in Rees Cycl.* Asclepias tuberosa, *Roxb. Fl. Ind.* ii. 38. A. volubilis, *Herb. Madr.* Gymnema aurantiaca, *Wall. mss.*

EASTERN PUNJAB, at Amballah, *Edgeworth*; and from BANDA southwards through the DECCAN PENINSULA. BURMA, *Wallich.* SINGAPORE, *Lobb.* CEYLON, at Amooradhapoora, *Gardner.*—DISTRIB. Ava.

Bark corky; young branches, &c., hoary. *Leaves* 1–2 in., coriaceous, pale, both

surfaces alike, nerves very faint; petiole ¼–½ in. *Cymes* solitary or in pairs, ½–1 in. diam.; many-fld.; peduncles shorter or longer than the petioles. *Calyx-lobes* obtuse. *Corolla* ¼ in. diam., thick, pubescent on both surfaces; tip of lobes keeled and thickened on the face, most so at the tips; tube glabrous, shining from the adnate corona which is continued halfway down the middle of the lobes. *Follicles* 2½–3 in. long, ½–¾ in. diam., turgid, straight, smooth, almost woody; beak thick, curved. *Seeds* ½ in., long, narrowly ovoid.—I think this hardly differs from an East African species.

2. **L. Spartium**, *Wight Contrib.* 48; erect, leaves narrowly linear or 0, cymes subsessile few-fld. hoary. *Wall. Cat.* 8199; *Dcne. in DC. Prodr.* viii. 629; *Boiss. Fl. Orient.* iv. 63. L. pyrotechnica, *Dcne. in Ann. Sc. Nat.* 1838. 269, and *in DC. Prodr. l. c.* L. Jacquemontiana and gracilis, *Dcne. ll. cc.* Cynanchum pyrotechnicum, *Forsk.*; *Del. Fl. Egypt*, t. 20. Sarcostemma pyrotechnica, *Br. Prodr.* 453. Microloma pyrotechnica, *Spreng. Syst.* i. 855. M. angustifolia, *Herb. Ham.*

The PUNJAB and SCINDE, eastwards to the Jumna.—DISTRIB. Beluchistan, Arabia, Egypt, Senegambia.

A glabrous shrub 3–4 ft. high, with long erect twiggy branches. *Leaves* when present 3–4 by ¼ in., acuminate, shortly petioled, leathery. *Flowers* as in *L. reticulata*, but smaller, ⅛ in. diam. *Follicles* 5 in. long, ⅛ in. diam., terete, straight, produced into a very long slender straight beak.

48. ORTHANTHERA, *Wight.*

An erect twiggy leafless shrub. *Flowers* small, in dense-fld. peduncled woolly cymes. *Sepals* lanceolate, eglandular. *Corolla* salver-shaped, tube ovoid, equalling the lanceolate valvate lobes. *Corona* double; coralline of minute scales between the corolla-lobes; staminal a raised undulate ring below the anthers. *Column* ovoid, anther-tips inappendiculate; pollen-masses globose, sessile, erect. *Stigma* included, flat, 5-gonal. *Follicles* elongate, cylindric, opening out flat after dehiscence. *Seeds* comose.

O. viminea, *Wight & Arn. Contrib.* 48; *Royle Ill.* t. 66; *Dcne. in DC. Prodr.* viii. 626, and *in Jacquem. Voy. Bot.* 109, t. 105. Apocynea viminea, *Wall. Cat.* 7478.

NORTH-WEST INDIA; along the base of the Himalaya, alt. 1–3000 ft. from Peshawur and the Punjab to Oudh.

Branches stout, erect, as thick as a crowquill. *Peduncles* ¼–1 in.; flowers shortly pedicelled, very woolly. *Sepals* equalling the corolla-tube. *Corolla* villous outside, glabrous within; lobes keeled down the centre of the face. *Follicles* erect, 5 in. long.—The long sepals and salver-shaped corolla are such strong generic characters that I do not follow the "Genera Plantarum" in uniting this genus with *Leptadenia.*

49. BRACHYSTELMA, *Br.*

Erect or twining pubescent or glabrous herbs with tuberous roots. *Leaves* opposite, sometimes very narrow or minute. *Flowers* few, in axillary sessile umbels or solitary, pedicels very slender. *Corolla* (in the Indian species) rotate; lobes 5, elongate, valvate. *Corona* short, adnate to the column, annular, variously 5–10-lobed or -toothed, lobes or teeth erect or incumbent on the anthers. *Column* very short; anthers ovoid, tips inappendiculate, retuse; pollen-masses one in each cell, sessile, globose, erect, one margin pellucid. *Stigma* nearly flat. *Follicles* slender, smooth. *Seeds* comose.—DISTRIB. About 14 African species, and the following.

There are probably in India many species of this singular genus, which owing to their slender habit and inconspicuous flowers may be overlooked. I cannot find any character whereby to distinguish *Eriopetalum*, Wight, from *Brachystelma*. The following descriptions are all very imperfect.

* *Stem erect.*

1. **B. lævigatum**, *Hook. f.*; leaves minute subulate, umbels sessile, corolla glabrous or puberulous, segments thrice as long as the tube, corona with a broad 2-toothed lobe between the anthers, and as many narrow oblong ones opposite them. Eriopetalum lævigatum, *Wight Contrib.* 35; *Wall. Cat.* 8149; *Dcne. in DC. Prodr.* viii. 646. Gomphocarpus lævigatus, *Ham.*

NORTHERN OUDE; at Gorukpore, *Hamilton*.
Root the size of a small potato. *Stem* 12–18 in., pubescent upwards. *Umbels* minutely hispid, as are the subulate sepals. *Flowers* pendulous, ½ in. diam., pale dirty purple, with pale green segments. *Follicles* 3 in. long, erect.—Described partly from a drawing in Herb. Kew.

2. **B. parviflorum**, *Hook. f.*; leaves long slender almost filiform glabrous, flowers solitary very long-pedicelled, corolla villous segments twice as long as the tube, corona shortly irregularly toothed. Eriopetalum parviflorum, *Wight Contrib.* 35; *Dcne. in DC. Prodr.* viii. 646.

NORTH-WESTERN INDIA; Doongie, *Royle* (*Wight*).
Leaves 4 in. by $\frac{1}{10}$ in., acuminate. *Pedicels* 1–2 in. long, bracteate at the base. *Flowers* ¾ in. diam., white with a few spots on the tube and purple hairs on the margins and segments. *Sepals* subulate.—Described from a flower and drawing in *Herb. Wight.*

3. **B. attenuatum**, *Hook. f.*; segments of corolla filiform 4–5 times as long as the tube villous, corona shortly irregularly toothed. Eriopetalum attenuatum, *Wight Contrib.* 35; *Dcne. in DC. Prodr.* viii. 646.

NORTH-WESTERN INDIA; Doongie, *Royle* (*Wight*).
Flower ¾ in. diameter.—I have seen only a single flower in *Herb. Wight.*

4. **B. maculatum**, *Hook. f.*; glabrous, leaves long slender almost filiform, umbels sessile, corolla-lobes 2–3 times as long as the spotted tube keeled above down the middle glabrous except a few scattered long cilia, corona with 5 subulate teeth opposite to and much higher than the anthers.

CANARA OR MYSORE, *Law.*
Stem 10–12 in. *Leaves* 3–4 by $\frac{1}{10}$ in. *Flowers* 2–3 together, ⅔ in. diam. *Sepals* quite glabrous, subulate.

5. **B. glabrum**, *Hook. f.*; quite glabrous, leaves narrowly linear-lanceolate or strap-shaped acute, umbels sessile, corolla puberulous lobes linear obtuse three times as long as the tube, corona very short, minutely toothed.

DECCAN PENINSULA, *Beddome.*
Stem 6 in. *Leaves* 1–3 by $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* ¾ in. diam.

** *Stem twining.*

6. **B. volubile**, *Hook. f.*; quite glabrous, leaves long linear slender, umbels peduncled, corolla-lobes many times longer than the tube with very long scattered hairs, margins incurved, column very depressed discoid, corona forming a low broad obtusely 5-angled cup round its base.

The CARNATIC; on the Cuddapa hills, alt. 2000 ft., *Beddome.*
Stem several feet long. *Leaves* 3–5 by $\frac{1}{10}$–$\frac{1}{8}$ in., acuminate. *Umbels* 2–3-fid.

Corolla 1 in. diam., purplish, lobes crenulate. *Column* inserted by a very small base.

7. **B. Beddomei**, *Hook. f.*; glabrous, leaves very slender elongate acuminate, umbels peduncled 3 fld., corolla-lobes many times longer than the tube glabrous cohering by their tips corona with 5 very broad rounded lobes. Ceropegia brevitubulata, *Beddome Ic. Pl. Ind. Or.* t. 174.

MYSORE; Vellore hills, alt. 1000 ft., *Beddome.*

Glabrous, except the puberulous cyme. *Leaves* in distant pairs, 3–4 by $\frac{1}{8}$–$\frac{1}{4}$ in., narrowed to the sessile base. *Peduncle* $\frac{1}{8}$ in.; bracts setaceous; pedicels $\frac{1}{4}$ in. *Sepals* setaceous. *Corolla* quite glabrous, pale without, purple within; segments 1 in. long, very narrow, flat. *Corona* with the processes opposite the anthers so entirely confluent with them as to appear to be absent.—This singular species has the corolla of *Brachystelma* with the segments cohering by their tips as in *Ceropegia*; it unites the characters of these genera.

50. CEROPEGIA, *Linn.*

Twining, rarely erect herbs, often with a tuberous rootstock. *Leaves* opposite, sometimes minute or 0. *Flowers* in axillary peduncled umbelliform cymes, rarely solitary, often large, white or greenish and purple. *Sepals* narrow. *Corolla-tube* elongate, straight or curved, often swollen at the base, throat dilated or not; lobes very various, broad or narrow, erect or incurved with cohering tips, often at length recurved or reflexed. *Corona* adnate to the column, annular or cupular, 5–10-lobed and with 5 long or short ligulate processes within that are free or adnate to the anthers. *Column* short; anther short, obtuse; pollen-masses one in each cell, short, erect, sessile, with one pellucid margin. *Stigma* depressed or shortly 2-lobed, included. *Follicles* usually slender, terete, smooth. *Seeds* comose.—DISTRIB. Species about 50; tropical Asian, African and South African, with a few Malayan and Australian.

Herbarium materials do not suffice to enable me to discriminate satisfactorily the species of this most difficult genus, and still less to describe them accurately. The classification I here propose is quite artificial.

* Stem erect, rarely flexuous or twining.

1. **C. pusilla**, *Wight Ic.* t. 1261; dwarf, puberulous, leaves linear, corolla straight, lobes linear erect much shorter than the tube, tips puberulous. *Wall. Cat.* 8140; *Dcne. in DC. Prodr.* viii. 643.

DECCAN PENINSULA; Nilgherry and Anamallay Mts., alt. 7–8000 ft., *Wight*, &c.

Tuber $\frac{1}{2}$–1 in. diam. *Stem* 3–6 in. *Leaves* rather crowded, 1–3 by $\frac{1}{10}$–$\frac{1}{8}$ in., narrowed at the base. *Flowers* solitary or 2–3-nate, erect. *Sepals* $\frac{1}{8}$–$\frac{1}{4}$ in. *Corolla* 1 in., tube narrow, base ovoid. *Coronal lobes* 5, triangular, acute, 2-fid, ciliate; processes narrowly linear, three times as long. *Follicles* 2 in., narrowly fusiform.

2. **C. spiralis**, *Wight Ic.* t. 1267; quite glabrous, leaves very narrowly linear, corolla straight, lobes narrowly linear contorted as long as the tube fimbriate at the base.

DECCAN PENINSULA; Balaghat hills, Madras, *Wight*; Cuddapa hills, *Beddome.*

Stem slender, 4–6 in. *Leaves* 4–8 by $\frac{1}{10}$–$\frac{1}{8}$ in., margins recurved. *Flowers* solitary, shortly peduncled. *Sepals* filiform, $\frac{1}{8}$–$\frac{1}{6}$ in. *Corolla* 2 in. long, base slightly inflated, mouth hardly dilated. *Coronal lobes* 5, triangular, acute, glabrous; processes slender, three times as long.

3. **C. fimbrifera**, *Beddome in Madras Lit. Soc. Journ.* 1861, 53, and *Ic. Pl. Ind. Or.* t. 172; finely pubescent, leaves narrowly linear, corolla straight,

lobes as long as the tube narrowly linear erect or twisted together, fimbriate at the base with gland-tipped hairs. ? C. Munroi, *Wight Ic.* t. 1264.

TRAVANCORE; rocky place on the Anamallay hills, alt. 3–4000 ft., *Beddome*.

Stem 4–9 in., slender, glabrous below. *Leaves* 4–6 by $\frac{1}{4}$–$\frac{1}{3}$ in., narrowed at the base and gradually from the middle to the tip. *Peduncles* $\frac{1}{3}$–1 in., 1–4-fld. *Sepals* filiform, $\frac{1}{4}$ in. *Corolla-tube* subcylindric, green outside, purple within; lobes narrowed downwards from above the middle, basal margins reflexed, fimbriate with long slender hairs. *Coronal lobes* 10, triangular, ciliate; processes linear-spathulate, four times as long.—*C. Munroi* is only known from the very insufficient drawing engraved in Wight's Icones. Beddome has suggested to me its being a twining or flexuous form of this species, which becomes scandent in cultivation.

4. **C. attenuata,** *Hook. Ic. Pl.* t. 867; pubescent, leaves linear or linear-lanceolate, corolla straight lobes linear erect as long as the tube naked. *Dalz. & Gibs. Bomb. Fl.* 154; C. angustifolia, *Dalz. in Hook. Kew Journ.* ii. 259; *Dalz. & Gibs. l. c.* C. spiralis, *Herb. Ind. Or. H. f. & T.*

THE CONCAN; near Vingorla, and rocky pastures near the sea in Malwan, *Dalzell, Stocks*, &c.

Stem 6–12 in., slender or rather stout. *Leaves* 2–6 by $\frac{1}{8}$–$\frac{1}{2}$ in., narrowed at the base. *Peduncles* short, axillary, usually 1-fld. *Sepals* filiform, $\frac{1}{4}$–$\frac{1}{2}$ in. *Corolla* 2–2$\frac{1}{2}$ in. long, base swollen, mouth dilated, lobes very narrow from a triangular base, the margins of which are not reflected. *Coronal lobes* 5, triangular, entire or 2-fid, ciliate; processes narrow, 4 times as long. *Follicles* 3 in. long, very slender, terete, torulose. *Seeds* $\frac{1}{10}$ in., oblong, compressed, margins very thick, coma $\frac{1}{3}$ in.

5. **C. Lawii,** *H. f.*; pubescent, stout, leaves long-petioled ovate, peduncles many-fld., corolla slightly curved lobes small elliptic naked incurved very much shorter than the very narrow tube. Ceropegia n. 25, *Herb. Ind. Or. H. f. & T.*

SOUTH CONCAN, *Law, Stocks.*

Tubers 2–5 in. diam. *Stem* often as thick as a goose-quill, 1–2 ft. high. *Leaves* 2–4 by 1$\frac{1}{2}$–2 in., acute, sometimes rounded; petiole $\frac{1}{2}$–1 in. *Peduncle* 1–1$\frac{1}{2}$ in. strict; bracts minute; pedicels short. *Sepals* minute, recurved. *Corolla* 1–1$\frac{1}{4}$ in. long, base scarcely swollen; lobes $\frac{1}{8}$–$\frac{1}{4}$ in., incurved, forming a small subglobose head. *Coronal lobes* 10, obtuse, short, ciliate; processes slender, four times as long.

6. **C. Wallichii,** *Wight in Bot. Mag.*, note under t. 3267, and *Contrib.* 32; puberulous, stem very stout, leaves ovate or rounded subsessile, flowers fascicled, corolla straight lobes oblong obtuse densely fimbriate within erect much shorter than the tube. *Wall. Cat.* 8143; *Royle Ill.* t. 66, f. 3; *Dcne. in DC. Prodr.* viii. 644.

CENTRAL and WESTERN HIMALAYA; Nepal, *Wallich*; Kumaon at Nainital, alt. 6500 ft., *Strachey* and *Winterb.*

Stem 8–12 ft. in., as thick as a goose-quill. *Leaves* 2–2$\frac{1}{2}$, puberulous or glabrate above, tip obtuse acute or rounded. *Peduncle* very short; pedicels crowded, $\frac{1}{4}$–$\frac{1}{3}$ in.; bracts setaceous. *Sepals* filiform, $\frac{1}{4}$ in. *Corolla* 1$\frac{1}{2}$ in., tube narrow, base inflated, mouth funnel-shaped acutely 5-angled: lobes forming a narrow oblong obtuse crown $\frac{1}{3}$–$\frac{1}{2}$ in. long, ciliate with short fusiform stout hairs. *Coronal-lobes* 10, triangular, ciliate, processes four times as long. *Follicles* 1 foot long.

** Stem twining. Leaves fleshy. Calyx minute. Corolla small, straight (rarely 1 in. long) narrow; mouth slightly dilated; lobes short, narrow, erect, fleshy.

7. **C. bulbosa,** *Roxb. Cor. Pl.* i. 11, t. 7, and *Fl. Ind.* ii. 28; leaves various, corolla-tube slender, lobes linear from a triangular base villous within, corona glabrous lobes minute or obsolete, processes filiform straight.

From Western India; the Punjab and Upper Gangetic plain as far east as Allahabad, southwards to Travancore.

Root tuberous. *Stem* very slender. *Leaves* excessively variable (see the varieties). *Peduncles* $\frac{1}{2}$–1 in., 3–5-fld.; pedicels short. *Sepals* $\frac{1}{10}$ in. long. *Corolla* rarely 1 in. long, greenish, base moderately inflated mouth obtusely 5-angled; lobes $\frac{1}{3}$–$\frac{1}{2}$ the length of the tube, purple within. *Follicles* 4 in. long, slender, terete, pericarp thin. *Seeds* $\frac{1}{3}$ in. long, linear-oblong, wing membranous.

Var. 1. *bulbosa proper*; leaves petioled 1–2 in. rarely more orbicular oblong elliptic obovate or obcordate acute or apiculate, rarely elliptic lanceolate, base acute rounded or cordate. C. bulbosa, *Roxb. l. c.*, *Wight Contrib.* 32, and *Ic. t.* 845, and in *Hook Bot. Misc.* ii. 99 and *Suppl.* t. 2; *Wall. Cat.* 8141; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 643.

Var. 2. *Lushii*; leaves subsessile very narrowly linear 4–8 by $\frac{1}{6}$–$\frac{1}{3}$ in. C. Lushii, *Grah. in Bot. Mag.* t. 3300; *Dalz. & Gibs. Bomb. Fl.* 154; *Grah. Cat. Bomb. Pl.* 117; *Dcne. l.c.* 644. Bombay, in the Kasersaya jungles, *Dr. Lush.*

Var. 3. *esculenta*, leaves 4–5 by 1 in. shortly petioled linear-lanceolate. C. esculenta, *Edgew. in Journ. Linn. Soc.* v. 204; *Aitchison Cat. Punjab. Pl.* 90. Punjab and Mooltan.

8. **C. Wightii,** *Graham in Bot. Mag.* t. 3267; leaves subsessile or shortly petioled elliptic-lanceolate apiculate or acute, corolla-tube slender, lobes linear from a triangular base, corona glabrous, lobes 5 minute obtuse, processes short broad curved. *Wight Contrib.* 30; *Dcne. in DC. Prodr.* viii. 641.

East Indies, formerly cult. in the Edinburgh Bot. Gardens.
Probably a form of *C. bulbosa*, from Bombay.

*** Stem twining, stout. Leaves very small or 0.

9. **C. juncea,** *Roxb. Cor. Pl.* i. 12, t. 10; quite glabrous, fleshy, leaves if present elliptic-lanceolate acute, calyx small, corolla funnel-shaped above the middle, lobes erect nearly as long as the tube. *Wight Contrib.* 30; *Wall. Cat.* 8134; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 641.

Deccan Peninsula, from Bombay and the Circars to Tanjore and Mysore.

Root tuberous. *Stem* simple, as thick as a goose-quill. *Leaves* very remote, often suppressed, rarely 1 in. long, subsessile. *Peduncle* stout, $\frac{1}{2}$–1 in., 3–5-fld.; pedicels short, stout. *Sepals* $\frac{1}{4}$ in., subulate. *Corolla* greenish, speckled and veined with purple, base inflated, lobes linear from a triangular base, tips fimbriate within. *Coronal lobes* 10, short, ovate, obtuse, ciliate; processes filiform with hooked tips. *Follicles* 7 in. long.

**** Stem twining, leafy. Leaves membranous. Flower 1 in. long and upwards, rarely less.

† Corolla-lobes much shorter than the tube, very broad, forming a hemispherical or broadly conical crown over the much-dilated broadly funnel-shaped throat of the tube. Corolla curved, base much inflated in all.

10. **C. elegans,** *Wall. in Bot. Mag.* t. 3015, and *Cat.* 8135; quite glabrous, leaves ovate or ovate-lanceolate, corolla-lobes broadly ovate acute ciliate with very long hairs, coronal lobes 10 subulate or linear glabrous almost as long as the straight linear processes. *Wight Contrib.* 31, and *Ic.* t. 1265; *Dcne. in DC. Prodr.* viii. 642. ? C. sphenanantha, *Wight & Arn. Contrib.* 31; *Wall. Cat.* 8138; C. sphenanthera, *Dcne. l. c.* 643.

Malabar and Travancore, on the mountains from the Nilgherries southwards. Ceylon, alt. 3000 ft., *Walker*, &c.

Leaves 2–4 by 1–1$\frac{1}{2}$ in., acute or acuminate; petiole $\frac{1}{4}$–1 in., very slender. *Peduncles* $\frac{1}{4}$–2 in.; flowers subumbellate; pedicels short; bracts subulate. *Sepals* filiform,

glabrous. *Corolla* 1¼–1¾ in., spotted with dark purple, base globose or oblong and gibbous, crown ¾–1 in. diam. *Follicles* 7–9 in., very slender, terete, membranous. *Seeds* nearly ½ in. long, linear, convex on one face, deeply grooved on the opposite one.—I can detect no character, except perhaps the shorter and more obtuse coronal lobes, whereby to distinguish *C. sphenanantha.*

The coronal lobes are described by Wight as hirsute, but they are perfectly glabrous in ten flowers I have examined, and they are so represented in a drawing made in the Calcutta Garden, and in another made from specimens grown at Kew. Wight's specimen is accompanied with a loose sketch of a hairy corona, placed in a cover with a loose flower, in which latter the corona is glabrous.

11. **C. mysorensis,** *Wight Ic.* t. 846; glabrous or petioles and leaf-nerves beneath minutely hairy, leaves ovate acuminate, corolla-lobes ovate naked, coronal lobes long subulate glabrous, processes filiform.

MYSORE and TRAVANCORE; on the Pulney Mts., *Wight.*

This very closely resembles *C. elegans* in habit, and the form and size of the flowers, but the latter are of a very pale straw colour or greenish, and the lobes are entirely naked. *Leaves* 1½–2 in. long. *Sepals* ⅙ in. subulate. *Corolla* 1–1½ in.

12. **C. Walkeriæ,** *Wight Ic.* t. 1266; quite glabrous, leaves ovate or ovate-lanceolate acuminate, corolla-lobes ovate naked, coronal lobes 10 linear, glabrous nearly as long as the linear processes.

CEYLON, *Walker, Wight.*

Very similar to and probably a variety of *C. mysorensis*, but the leaves are 3–4 in. long, the sepals are longer, ⅓–½ in., the corolla much larger, 2–2½ in. long, blotched with purple, the tube narrower above the globose base, and the coronal lobes different.

13. **C. Gardneri,** *Hook. Bot. Mag.* t. 5306; quite glabrous, leaves lanceolate or ovate-lanceolate acuminate, corolla-lobes ovate-cordate ciliate, coronal lobes 10 linear ciliate, processes rather longer linear. *Thwaites Enum.* 199.

CEYLON; Ramboddy, alt. 4–5000 ft., *Gardner,* &c.

Except by the ciliate coronal lobes I do not see how dried specimens of this can be distinguished from *C. elegans.* According both to the figure in the Botanical Magazine, and to a sketch made in Ceylon, the leaves are purplish beneath. Thwaites, who joins both *C. mysorensis* and *Walkeriæ* with *C. elegans*, regards *Gardneri* as distinct, but does not say on what grounds. According to drawings sent by him to Sir W. Hooker, the Cingalese plant called by him *C. elegans* has very broad leaves, a greenish corolla spotted pale-purple with a hemispheric crown of green cordate lobes tipped with dark purple and fimbriate at the tips only, whereas *C. Gardneri* has a deep purple black corolla with a depressed crown of much broader lobes ciliated at the base only. The follicles and seeds of Thwaites' specimen of *Gardneri* precisely accord with those of *C. elegans.*

14. **C. longifolia,** *Wall. Pl. As. Rar.* i. 56, t. 73, and *Cat.* 8136; sparsely puberulous, leaves shortly petioled elongate- or linear-lanceolate acuminate, corolla-lobes ovate ciliate, coronal lobes 10 lanceolate ciliate, processes linear twice as long. *Wight Contrib.* 31; *Dcne. in DC. Prodr.* viii. 642. C. lanceolata, *Wight l. c.*; *Wall. Cat.* 8139; *Dcne. l. c.* 643.

CENTRAL HIMALAYA, Nepal, *Wallich*; Kumaon, alt. 4–5000 ft., *Edgeworth.*

Stem with a line of pubescence. *Leaves* 5–8 by ¾–1½ in., base acute or rounded; petiole ¼–½ in. *Peduncle* 1–1½ in., hairy; pedicels fascicled, ¼–½ in.; bracts subulate. *Sepals* ¼ in., very slender. *Corolla* 1½ in., green spotted dark purple, tube curved; lobes very broadly ovate. *Follicles* 6 in. long, very slender. *Seeds* ⅓ in., linear-oblong, concavo-convex.—Approaches *C. lucida*, differing in the much broader shorter head of the corolla and longer sepals. Wight describes *C. lanceolata* as glabrous and as having the coronal lobes shorter than the column, thus placing it in a different

section from *C. longifolia*, but there is no difference whatever between the authentically named specimens of these species in either Wight's or Wallich's Herbaria. The foliage closely resembles that of *C. angustifolia.*

†† Corolla-lobes shorter than the tube (nearly as long in *C. pubescens*), oblong obovate linear or elliptic, forming a conical ellipsoid ovoid or beaked crown over the not greatly dilated throat.

a. Leaves and peduncles perfectly glabrous.

15. **C. tuberosa,** *Roxb. Cor. Pl.* i. 12, t. 9; quite glabrous, leaves fleshy from orbicular apiculate to lanceolate acuminate, corolla straight, lobes ⅓ shorter than the tube suddenly contracted from a triangular base into linear cohering appendages that are at first connate throughout their length and villous within. *Wight Contrib.* 33, and *Ic.* t. 353; *Wall. Cat.* 8145, *excl.* A; *Dalz. & Gibs. Bomb. Fl.* 154; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 644. C. acuminata, *Dalz. & Gibs. l. c. not of Roxb.* C. mucronata, *Roth Nov. Sp.* 179. C. Candelabrum, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 27, *not of Linnæus.*

Deccan Peninsula; from the Concan southwards, common.

Root tuberous. *Stem* slender. *Leaves* 1–4 in. (fleshy, *Dalzell*), base acute or rounded; petiole ¼–⅔ in. *Peduncles* 1–3 together, ½–3 in.; pedicels fascicled or subpaniculate; bracts minute. *Sepals* subulate, ⅛ in., recurved. *Corolla* 1–2 in., base somewhat inflated, mouth slightly dilated. *Coronal lobes* ciliate, very short. *Follicles* 4–5 in. long, slender. *Seeds* ¼ in. long, linear.

16. **C. Candelabrum,** *Linn. Sp. Pl.* 211; glabrous, leaves oblong acute or apiculate base cordate, peduncles pendulous, flowers whorled erect, corolla-base globose, lobes very short ovate acute united by the tips only. *Dcne. in DC. Prodr.* viii. 643.—*Rheede Hort. Mal.* ix. t. 16.

Malabar, *Rheede*; at Mangalor, *Perrottet* (*Dcne.*).

Stem slender, *Leaves* 2–3 by 1–1¼ in.; petiole 1 in. *Peduncles* 3 in.; pedicels ½ in.; flowers 10–12 in a whorl. *Sepals* small. *Corolla* 1¼ in.—I have seen no specimen of this striking species.

17. **C. Elliottii,** *Hook. f.*; quite glabrous, leaves elliptic acute, peduncle pendulous, flowers erect, corolla straight green base somewhat inflated, lobes very short ovate acute united at the tips only, coronal lobes obsolete, processes glabrous linear.

Deccan Peninsula; Sinhachalam hills, near Vizagapatam, *Sir W. Elliot.*

Root tuberous. *Stem* rather stout. *Leaves* 4 by 1½–2 in., base subacute; petiole 1 in. *Peduncles* 2½–3 in.; pedicels upcurved, ½–¾ in. *Corolla* 1¼ in., rather narrow above the swollen base, striped purple within, lobes pubescent at the tips within. *Follicles* 4 in. long, beaked.—Described from an excellent drawing given by Sir W. Elliot to General Beddome. It comes far nearer to *C. Candelabrum* than does any other species.

18. **C. acuminata,** *Roxb. Cor. Pl.* i. xii. t. 8, and *Fl. Ind.* ii. 29; quite glabrous, leaves short-petioled succulent elongate-lanceolate finely acuminate, peduncles short, corolla small straight, lobes short linear connate by their tips only, coronal lobes 5 minute, processes long filiform. *Wight Contrib.* 32; *Dcne. in DC. Prodr.* viii. 643.

The Circars; at Samulcottah, *Roxburgh.*

Root tuberous. *Stem* slender. *Leaves* 3–4 by ⅓ in., base acute, not 3-nerved; petiole ⅛ in. *Peduncle* ½ in., 4–6-fld.; pedicels ¼ in. *Sepals* small. *Corolla* ¾ in., white with purple streaks and lobes, base swollen, mouth dilated; lobes ¼ in., cohering by the tips only.—Described from Roxburgh. Wight suggests its being only a variety

of *C. bulbosa*, but the short corolla-lobes are very different. Roxburgh's locality, Samulcottah, has never been explored by a subsequent botanist.

19. **C. intermedia,** *Wight Ic.* t. 1263; quite glabrous, leaves long-petioled ovate or elliptic-lanceolate finely acuminate base 3-nerved, corolla straight, lobes subspathulate villous within connate by their tips only, coronal lobes 5 very short or 0 ciliate or glabrous processes long dilated upwards. C. tuberosa, *Wall. Cat.* 8145 A. C. Candelabrum, *Thwaites Enum.* 199.

TRAVANCORE; Courtallam and Dindygul, *Wight*; Anamallay hills, alt. 2500 ft., *Beddome.* CEYLON, in the hotter part of the island, *Walker, Thwaites.*

Root fibrous (*Beddome*). *Stem* slender. *Leaves* 2–3 by $\frac{3}{4}$–$1\frac{1}{4}$ in., pale yellow-brown when dry; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Peduncles* 1–2 in., 3–6-fld., pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* subulate. *Corolla* 1–$1\frac{1}{4}$ in., pale purplish, base inflated, lobes much shorter than in *C. tuberosa.*—Wight figures the coronal lobes as obsolete and the processes as hairy at the base; I find 5 minute glabrous lobes. He further figures the lobes of the corolla as linear, but describes them as subspathulate. An excellent drawing from Thwaites of what appears to be this species (his *C. Candelabrum*, C.P. 774) has purple branches. Wallich's 8145 A, from Heyne, appears to be the same.

? VAR. *Wightii*; leaves lanceolate acuminate, corolla-lobes broader glabrous, coronal lobes ciliate.—Courtallam, *Wight.*—Wight calls this *C. acuminata*, but it differs from Roxburgh's drawing in the leaves with slender petioles and strongly 3-nerved at the base.

20. **C. Thwaitesii,** *Hook. Bot. Mag.* t. 4758; quite glabrous, leaves elliptic ovate or ovate-lanceolate acuminate, peduncles 2–3-fld., corolla 2–$2\frac{1}{2}$ in. base ovoid, throat funnel-shaped, lobes oblong, tip not contracted obtuse erect half the length of the tube, coronal lobes subulate ciliate half as long as the linear straight processes.

TRAVANCORE; at Courtallam, *Wight*; Peermede Ghat, *Beddome.* CEYLON; central province, *Gardner*, &c.

Stem rather stout. *Leaves* 3–4 by $1\frac{1}{2}$–2 in., petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. *Peduncles* stout, 1–2 in., pedicels $\frac{1}{2}$–1 in. *Corolla* curved, green with purple blotches above the middle of the tube, and a purple band across the lobes above the middle. *Follicles* (in Peninsular specimens) 10 in. long, very slender. *Seeds* $\frac{1}{2}$ in. long.—The leaves are figured and described in *Bot. Mag.* as ciliolate, but I do not detect this in the only Ceylon example I have seen (a most incomplete one).

β. Leaves and peduncles pubescent or hispid.

21. **C. hirsuta,** *Wight & Arn. Contrib.* 33; hirsute or pubescent, leaves from linear or lanceolate to ovate-cordate acuminate, peduncles hispid, sepals long slender, corolla $1\frac{1}{2}$–2 in. long, base ventricose, lobes suberect oblong obtuse ciliate $\frac{1}{3}$ of the length of the tube, coronal processes hooked.

DECCAN PENINSULA; from the Concan to Travancore.

A coarse climber, more or less clothed with subhispid spreading hairs. *Leaves* 2–4 in.; petiole $\frac{1}{2}$–1 in. *Peduncles* $\frac{1}{2}$–2 in., very hispid; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* $\frac{1}{3}$ in., very slender. *Corolla* greenish, blotched with purple. *Corona* very variable, but the processes always broad and curved or hooked at the tip. *Follicles* 4 in. long, slender. *Seeds* $\frac{1}{3}$ in., narrowly oblong.—After a very tedious examination of the corona in specimens collected at various places between Bombay and Travancore I conclude that the following are referable to one variable plant, an opinion in which I am confirmed by Colonel Beddome; vars. 1–4 are all mixed in Stock's and Dalzell's Herbaria, and none being authentically named I cannot positively say which answers to the species described in the Bombay Flora.

VAR. 1. *hirsuta proper*; all over hirsute except the corolla, coronal lobes 5 short triangular 2-fid ciliate much shorter than the processes. C. hirsuta, *Wight l. c.*; *Dcne. in DC. Prodr.* viii. 641.

VAR. 2. *vincæfolia*; branches glabrous, leaves less and more softly pubescent ovate-cordate, peduncles hispid, coronal lobes 5 short rounded emarginate ciliate. C. vincæfolia, *Hook. Bot. Mag.* t. 3740; *Dalz. & Gibs. Bomb. Fl.* 153; *Dcne. in DC. Prodr.* viii. 642.—I have seen no authentic specimen of this.

VAR. 3. *ophiocephala*, hirsute all over except the corolla, leaves hispid on both surfaces, lobes of corolla oblong obtuse narrowed and purple at the base yellow in the middle, tips green, coronal lobes 10 obtuse 2-fid connate nearly to the tips yellow bordered with purple. C. ophiocephala, *Dalz. in Hook. Kew Journ.* ii. 259; *Dalzell & Gibs. Bomb. Fl.* i. 54.

VAR. 4. *Jacquemontiana*; hirsute all over except the corolla, leaves softly tomentose, "lobes of the corolla broader upwards entirely green," *Dalzell*, coronal lobes united to the middle ciliate. ? C. Jacquemontiana, *Dcne. in DC. Prodr.* viii. 641; *? Dalz. & Gibs. Bomb. Fl.* 153.—Carli, *Jacquemont.* I am doubtful if Dalzell's plant is Jacquemont's. Decaisne describes the latter as having the lobes of the corolla nearly as long as the tube, which is not the case with any of the forms I have referred to *hirsuta*.

VAR. 5. *stenophylla*; leaves narrowly linear, margins flat or recurved.—Pulney Mts., *Herb. Wight*; Anamallays, alt. 3500-5000 ft., *Beddome.* One of Wight's specimens has no coronal lobes, the other and Beddome's have 5 rather large 2-toothed ciliate ones. Beddome describes the roots as fibrous.

22. **C. oculata,** *Hook. Bot. Mag.* t. 4093; branches glabrous, leaves ovate or ovate-cordate acuminate ciliolate, peduncles hispid, corolla 2–2½ in. long base large much inflated, lobes erect lanceolate half the length of the tube, tips contracted pubescent, coronal lobes short ciliate 2-toothed, processes slender straight erect. *Dalz. & Gibs. Bomb. Fl.* 151.

The CONCAN; Bombay, *Miss Jones, Dalzell.*

Leaves 4–6 by 1½–2½ in., membranous; petiole ½–1 in. *Peduncle* 1½–2 in., 4–8-fld. *Sepals* ¼–⅓ in., slender, nearly glabrous. *Corolla* very pale, spotted with purple below the lobes; lobes green above the middle, pale, each with a large purple blotch below it.—Described chiefly from the *Bot. Mag.*, where the leaves are said to have glands above at the insertion of the petiole, which is not the case with the plants in Dalzell's Herbarium which I refer to this species. It no doubt varies greatly from the above characters. But for the erect straight inner coronal processes I should be disposed to refer this to *C. hirsuta* (see also 30, *C. Stocksii*).

23. **C. ciliata,** *Wight Ic.* t. 1262; branches hairy above, leaves linear- to ovate-lanceolate acute or acuminate pubescent above and beneath, peduncles very long hispid very many-fld., corolla ¾ in. gently curved, base slightly swollen, lobes very narrow linear erect one-third the length of the tube, coronal lobes 5 very short 2-toothed ciliate, processes slender hooked.

NILGHERRY and PULNEY MTS., *Wight, Beddome.*

Hispidly pubescent nearly all over. *Root* tuberous. *Leaves* 2–3 by ¼–2 in.; base acute rounded or cordate, petiole ¼–½ in. *Peduncles* 1–5 in., very stout, sometimes shortly branched and 20-fld.; pedicels ¼–½ in. *Sepals* slender, hispid, ¼–⅓ in. *Corolla* greenish, lobes lead-coloured, tips forming an oblong head. *Follicles* 3 in. long.

24. **C. angustifolia,** *Wight Contrib.* 31; branches and peduncles pubescent on one side, leaves narrowly elongate-lanceolate pubescent above ciliolate, peduncles few-fld., corolla 1¼–2 in. nearly straight base slightly inflated, lobes short suberect broadly obovate glabrous one third the length of the tube, coronal lobes 10 lanceolate ciliate, processes straight linear rather longer. C. longifolia, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS. alt. 4–6500 ft., *Wallich,* &c.

An extensive slender climber. *Leaves* 2–9 by ⅓–¾ in., rather coriaceous, minutely pubescent above, finely acuminate, margin often recurved; petiole ¼–½ in. *Peduncles*

1-1½ in. 3-6-fld.; pedicels ¼-⅓ in. *Sepals* glabrous, subulate, ¼ in. *Corolla* pale purple, lobes quite glabrous forming an ovoid crown.—Except in the small sepals, much narrower corolla mouth and form of the lobes and crown, this is almost identical with the Nepalese *C. longifolia.*

25. **C. pubescens,** *Wall. Pl. As. Rar.* ii. 81, 187, and *Cat.* 8144 *B.*; sparsely pubescent or glabrate, leaves long-petioled ovate acuminate, peduncles glabrous 3-∞-fld., sepals small, corolla 2-2½ in. straight base hardly swollen lobes linear erect from an ovate base cohering from the middle glabrous nearly as long as the tube, coronal lobes minute or obsolete ciliate, processes linear erect. *Dcne. in DC. Prodr.* viii. 644.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-8000 ft., *J. D. H.*, *Treutler.* KHASIA MTS., alt. 4-5000 ft., *J. D. H.*

Branches slender, nearly glabrous. *Leaves* 3-7 by 1½-3 in., very membranous, base sometimes cordate, sparsely pubescent on both surfaces or glabrous, ciliolate; petiole 1-2 in. *Peduncle* ½-2½ in. *Sepals* ⅛-⅙ in., recurved. *Corolla-tube* pale dirty purple, sub-cylindric, mouth hardly dilated; lobes yellow with purplish tips forming a long-beaked crown.—This approaches closely *C. tuberosa*, but is always more or less pubescent and it has much longer corolla-lobes. Amongst Cathcart's drawings (in Herb. Kew.) is one apparently of this species having a green corolla with yellow bases to the lobes. Wallich's 8144 A. (*Herb. Heyne*) is probably *C. tuberosa*, but the specimens are undeterminable.

3790 26. **C. Hookeri,** *Clarke mss.*; minutely pubescent, leaves short-petioled ovate acuminate, peduncles 1-2-fld., sepals minute, corolla 1 in. long straight base swollen, lobes short linear-lanceolate one third the length of the tube, coronal lobes minute or obsolete ciliate, processes slender erect. Ceropegia, n. 23, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen, alt. 8-10,000 ft., *J. D. H.*

Stem very slender and as well as the petioles leaves on both surfaces and peduncles sparsely minutely hairy. *Leaves* 1-2 by ¾-1 in., very membranous; petiole ¼-⅓ in. *Peduncles* shorter or rather longer than the petioles. *Corolla* short, dark purple, narrow from above the base to the mouth, which is rather contracted, lobes gently curved forming a short ellipsoid crown.

††† Corolla-lobes as long or nearly as long as the tube (or shorter in *C. odorata*).—See also 25, *C. pubescens.*

a. Corolla-tube broadly funnel-shaped upwards from above or below the middle.

27. **C. lucida,** *Wall. Pl. As. Rar.* ii. 33, t. 139 and *Cat.* 8133; quite glabrous, leaves ovate or lanceolate, peduncles many-fld., sepals small, corolla 1½-2 in. curved, lobes linear from a lanceolate base tips dilated ciliate, coronal lobes 10 short triangular ciliate, processes linear-spathulate. *Dcne. in DC. Prodr.* viii. 641.

SILHET, at Terrya Ghat, *Wallich, J. D. H. & T. T.* CACHAR, *Keenan.* BURMA at Prome, *Wallich.*

An extensive climber; root irregularly tuberous. *Leaves* 4-7 by 1½-3 in., membranous; petiole ½-1½ in. *Peduncles* short, ½-1 in.; pedicels as long. *Sepals* ¼-⅓ in. *Corolla* scarcely dilated at the base, green spotted with purple, lobes inflexed from above the base, tips brown connate by all the dilated part.

28. **C. Decaisneana,** *Wight Ic.* t. 1259; quite glabrous, leaves short-petioled elongate- or linear-lanceolate acuminate, peduncles 1-3-fld., sepals long filiform, corolla 2½-3 in. curved base very largely inflated, lobes linear from a

lanceolate base, coronal lobes 5 linear forked at the tip villous half as long as the slender linear straight processes.

NILGHERRY MTS.; at Sispara Ghat, *Wight*, &c.

Root tuberous. *Stem* rather stout. *Leaves* 4–7 by ¾–1½ in., membranous, base acute, margins obscurely ciliolate; petiole ⅓–½ in. *Peduncle* slender, 1–5 in.; pedicels 1–3 in. *Sepals* ½–⅔ in., sometimes puberulous. *Corolla* large, pale, spotted with pale purple, inflated base sometimes ⅔ in. diam., lobes sometimes longer than the tube, tips slightly dilated. *Coronal lobes* rigid, yellow with purple tips.

29. **C. brevicollis,** *Hook. f.*; leaves ovate or lanceolate acuminate puberulous on both surfaces, peduncle sparsely hairy 3–6-fld., sepals filiform, corolla 2 in. long curved, base very broadly inflated, tube with a very short neck and broad funnel-shaped limb, lobes erect linear from an ovate-lanceolate base, tips incurved, coronal lobes obsolete, processes linear erect.

TRAVANCORE; Anamallay hills, alt. 2500 ft., *Beddome.*

Stem slender, glabrous. *Leaves* very variable, 2½–6 by 1½–2 in., membranous, sometimes linear-oblong; petiole ¾–1¼ in. *Peduncles* slender, 1–2 in., glabrous or sparsely hairy; pedicels slender, ¾–1½ in. *Sepals* ⅓. *Corolla-base* obliquely inflated, dilating again shortly above the inflation into a broad funnel; lobes longer than the tube, linear for half their length.

30. **C. Stocksii,** *Hook. f.*; leaves ovate or ovate-cordate acuminate puberulous on both surfaces, peduncles 3–∞-fld. hispid, sepals filiform; corolla 2½–3 in. straight base slightly inflated, lobes erect linear from a small base, tips incurved, coronal lobes 5 short broad ciliate, processes linear straight.

The CONCAN, *Stocks.*

An extensive climber. *Leaves* 2–5 by ¼–2 in., membranous; petiole ½–1 in. *Peduncle* stout, 1–1½ in.; pedicels very short, hispid. *Sepals* ¼–½ in. *Corolla* large.—This closely resembles *C. oculata*, differing in the long linear corolla-lobes. It may be a form of that plant; if so, the corolla affords a most treacherous character.

β. Corolla-tube narrow, subcylindric above.

31. **C. macrantha,** *Wight Contrib.* 31; nearly glabrous, leaves short-petioled elliptic-lanceolate acuminate, peduncles short pubescent many-fld., sepals filiform, corolla curved tube narrow base swollen, lobes slender erect linear glabrous cohering from above the middle, coronal lobes ovate-lanceolate villous, processes straight linear. *Dcne. in DC. Prodr.* viii. 642.

TROPICAL HIMALAYA; Kumaon, alt. 4500 ft., *Royle*, &c.; Sikkim, alt. 2–5000 ft., *J. D. H.*, *Treutler.*

An extensive rather stout climber; branches glabrous. *Leaves* 4–7 by 1½–3½ in., very membranous, glabrous or sparsely puberulous on both surfaces, base acute; petiole ¼–½ in. *Peduncles* longer and stouter than the petioles; pedicels ¼–¾ in.; bracts many, subulate. *Sepals* ⅓ in. *Corolla* pale, base sometimes globose, lobes with a broad ovate base, above it forming a long straight beak. *Follicles* 4–5 in. long.

32. **C. Arnottiana,** *Wight Contrib.* 32; nearly glabrous, leaves short-petioled narrowly lanceolate or oblong-lanceolate acuminate, peduncles short few-fld., sepals small, corolla 2 in. narrow straight base hardly inflated, lobes very slender erect longer than the tube, coronal lobes 5 short obtuse notched subciliate, processes linear straight. *Dcne. in DC. Prodr.* viii. 644.

KHASIA MTS., *Lobb.* BURMA at Prome, *Wallich.* TENASSERIM; Moulmein, *Lobb.*

Stem very slender, glabrous. *Leaves* 3–5 by ¼–1 in., rather firm, glabrous or minutely puberulous above, ciliolate; petiole ¼–½ in. *Peduncle* ¼–1 in. slender;

pedicels very short; bracts setaceous. *Sepals* $\frac{1}{4}$ in. *Corolla* sub-cylindric; lobes lanceolate at the base, tips slightly dilated. *Follicles* 4 in. long, slender. *Seeds* $\frac{1}{10}$ in. long, linear-oblong.

33. **C. odorata,** *Nimmo in Grah. Cat. Bomb. Pl.* 118; nearly glabrous, leaves short-petioled lanceolate acuminate, peduncles short hispid many and dense-fld., corolla 1 in. slender straight base not swollen, lobes very narrow erect, coronal lobes minute glabrous.

The CONCAN; Salsette, *Nimmo, Law.*

Stem slender, glabrous. *Leaves* 3–4 by $\frac{1}{2}$–$\frac{3}{4}$ in., rather firm, glabrous or minutely puberulous above; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Peduncles* $\frac{1}{4}$–$\frac{3}{4}$ in., pedicels very short; bracts squarrose. *Sepals* $\frac{1}{4}$ in., recurved. *Corolla* one of the narrowest of the genus, yellow, sweet-scented, lobes variable in length, at first united by the tips, soon free.

34. **C. ensifolia,** *Beddome Ic. Pl. Ind. Or.* 173; stem glabrous, leaves subsessile or short-petioled elongate linear acute or apiculate nerveless finely reticulate, peduncles hispid often very long, sepals small, corolla 1 in. slender straight base inflated, lobes linear erect, coronal lobes 5 short obtuse ciliate, processes long linear erect.

TRAVANCORE; Anamallay hills, alt. 3–3500 ft., *Beddome.*

Root tuberous. *Stem* very slender. *Leaves* 4–7 by $\frac{1}{6}$–$\frac{1}{3}$ in., firm, glabrous or minutely puberulous above, finely reticulate beneath; petiole 0–$\frac{1}{3}$ in. *Peduncles* 1–5 in., often bearing a succession of fascicles of flowers; pedicels very short. *Sepals* $\frac{1}{6}$ in. *Corolla* greenish-white, lobes as long or longer than the tube. *Follicles* 6–7 in.

35. **C. albiflora,** *Hook. f.*; pubescent, leaves short-petioled ovate- or linear-lanceolate nerves distinct oblique, peduncles hispid often very long, sepals subulate, corolla 1$\frac{1}{2}$–2 in. slender straight base not inflated, lobes linear erect, coronal lobes 5 very short ciliate processes long linear erect.

TRAVANCORE; near Peermede, alt. 3500–4500 ft., *Beddome.*

Very similar to *C. ensifolia*, in habit, inflorescence, bracts, &c., but, as I am assured by Colonel Beddome, quite distinct, more hispidly pubescent, with much broader distinctly nerved leaves and white flowers. The peduncle is sometimes 8 in. long, and bears 4 or 5 remote sessile fascicles of flowers.

36. **C. Beddomei,** *Hook. f.*; sparsely pubescent, leaves subsessile elongate linear-lanceolate acuminate, nerves very slender, peduncle stout hispid few-fld., sepals filiform, corolla 3 in. long slightly curved, tube slender swollen below funnel-shaped above, lobes slender elongate erect villous within, coronal lobes very short notched ciliate processes broad hooked.

TRAVANCORE; Peermede, alt. 2500 ft., *Beddome.* COCHIN, *Johnston.*

Stem hispid above. *Leaves* 5–6 by $\frac{1}{3}$–$\frac{1}{2}$ in., rather firm, finely acuminate, narrowed to the base, sparsely puberulous on both surfaces, midrib strong, nerves few and extremely fine. *Peduncle* 1–3 in. stout, pedicels short. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla* dark purple, $\frac{1}{3}$ in. diam. at the mouth, lobes gradually narrowed from the base to the tips.—I have seen but one good specimen of this, Colonel Beddome's; that from Cochin is imperfect, and appears to have straight coronal processes.

DOUBTFUL AND UNDESCRIBED SPECIES.

C. MICANS, *Nimmo*, and C. ARCTA, *Nimmo*, from the Concans, and mentioned by name only in Graham *Cat. Bomb. Pl.* 118, are unknown to me.

C. BIFLORA, *Linn. Fl. Zeyl.* 46, and *Sp. Pl.* 211; from Ceylon. The only character given for this, "peduncles 2-flowered," may apply to any Ceylon species. Wight refers it doubtfully to *C. tuberosa*, which is not a Ceylon plant.

51. **FREREA,** *Dalz.*

A low fleshy quite glabrous erect shrub, branches terete. *Leaves* opposite, oblong. *Flowers* large, solitary or in pairs, axillary. *Sepals* triangular-ovate, acute. *Corolla* rotate, lobes broad, acute, valvate. *Corona* a low broad, 5-angled ring round the column, with 5 broad short truncate or retuse spreading lobes alternating with 5 long narrow processes opposite the anthers and inflexed over them. *Column* very short; anthers retuse, inappendiculate; pollen-masses one in each cell, short, erect, one margin pellucid. *Stigma* flat, included. *Follicles* terete, smooth. *Seeds* comose.

F. indica, *Dalz. in Journ. Linn. Soc.* viii. 10, t. 3.

The CONCAN; hill foot near Hewra, alt. 3000 ft., *Dalzell.*

Branches very short, $\frac{1}{2}$ in. diam., nodose. *Leaves* sessile, 1 in., sometimes spathulately obovoid, obtuse or retuse. *Flowers* very shortly dicelled. *Corolla* purple. *Corona* as in *Boucerosia,* from which the genus differs in habit.—Described from Dalzell's figure and characters.

52. **CARALLUMA,** *Br.*

Fleshy, erect, nearly leafless herbs, with very thick subterete or angular stems and branches. *Leaves* minute and caducous, or 0. *Flowers* solitary, or in pairs at the upper nodes. *Sepals* acute. *Corolla* broadly campanulate; lobes 5, narrow, valvate. *Corona* annular, adnate to the column, 5-lobed, lobes 2-cuspidate, with a ligulate process at the sinus on the inner face which overlaps the anther. *Column* very short; anthers short, retuse, incumbent on or confluent with the stigma, tips inappendiculate; pollen-masses one in each cell, short, erect, one margin pellucid. *Stigma* flat. *Follicles* slender, smooth, terete. *Seeds* comose.—DISTRIB. Species 4; Western India and Arabia.

The corona is that of *Boucerosia,* but the habit and inflorescence are very different, the stem and branches gradually narrowing upwards and becoming very slender. I have had to describe the species for the most part according to drawings in Herb. Kew.

* *Corolla glabrous within.*

1. **C. edulis,** *Benth. Gen. Pl.* 782; stem and branches subterete 4-grooved, corolla glabrous, tube inflated, lobes ovate-lanceolate. Boucerosia edulis, *Edgew. in Journ. Linn. Soc.* vi. 205, t. 1. B. ascendens, *Wall. Cat.* 8146, *in part.* B. Stocksiana, *Boiss. Fl. Orient.* iv. 64.

The PUNJAB; at Rawul Pindee, *Aitchison*; Mooltan, *Edgeworth.* SCINDE, *Stocks.*

Erect, 6–18 in. high, simple or sparingly branched. *Leaves* $\frac{1}{2}$ in. long, ovoid-lanceolate, acute, fleshy, caducous. *Flowers* $\frac{1}{3}$ in. diam., purple within.

2. **C. adscendens,** *Br. in Mem. Wern. Soc.* i. 25; stem 4-angled slender terete above, branches glabrous, tube short funnel-shaped, lobes lanceolate acute. *Wight Contrib.* 33; *Wall. Cat.* 8146, *in part*; *Dcne. in DC. Prodr.* viii. 647. Stapelia adscendens, *Roxb. Cor. Pl.* i. 28, t. 30.

DECCAN PENINSULA; in arid places, *Wight.*

Stem ascending, 1–2 ft. high; branches slender above. *Flowers* $\frac{1}{2}$ in. diam., dark purple within.

** *Corolla fringed or hairy within.*

3. **C. attenuata,** *Wight Ic.* t. 1268, and *Ill.* t. 155 *b,* fig. B.; stem

4-angled, branches slender and terete above, corolla-tube short funnel-shaped, lobes fringed with long hairs.

SOUTH DECCAN MTS.; Nilgherries, Pulneys, &c., *Wight*, &c. COCHIN, *Johnstone.* CEYLON; between Kandy and Badulla.

Habit of *C. adscendens*, but differing according to Wight's plate in the larger flowers with deeply fringed petals. The Ceylon plant, according to a drawing from Thwaites, is smaller with much smaller flowers borne on the 4-angled stems, not on slender terete branches as in the Peninsular one; it is possibly *C. fimbriata.*

1. **C. fimbriata,** *Wall. Pl. As. Rar.* i. 7, t. 8; stems much diffusely branched 4-angled to the ends of the branches, corolla rotate, segments copiously fimbriate. *Wight Contrib.* 34; *Dalz. & Gibs. Bomb. Fl.* 155.

DECCAN PENINSULA; from the Concan southwards, in arid rocky places.—DISTRIB. Ava.

Wight refers the Peninsular to the Ava plant, remarking that the flowers of the former are much larger (they are 1 in. diam. in Wallich's drawing), but finds no other difference. In both the arms of the coronal lobes are long subulate and hooked. —Amongst Wight's drawings is one of a plant with the habit of *fimbriata*, that is, bearing the flowers on the curved 4-angled ends of the branches, but with short ovate ciliate corolla-lobes, green, banded with purple, ending in fimbriate linear tips. If this is Wight's *fimbriata*, it differs much from Wallich's.

53. BOUCEROSIA, *Wight & Arn.*

Fleshy leafless herbs, with thick 4-angled stems, angles toothed. *Flowers* terminal, rather large, solitary or umbelled, more or less purple. *Sepals* narrow. *Corolla* campanulate or rotate; lobes 5, short, broad, valvate. *Corona* annular, adnate to the column, 5-lobed; lobes 2-fid, subulate, erect or spreading with a linear fleshy process on the inner face at the sinus inflexed over the anther. *Column* minute, short; anther-tips inappendiculate; pollen-masses one in each cell, sessile, erect, suborbicular, compressed. *Stigma* low, conical, 5-angled, tip truncate depressed. *Follicles* slender, straight, terete, smooth. *Seeds* flat, winged, comose.—DISTRIB. Species 12; Spain, North Africa, Arabia, Western India.

For the definition of the species of this genus (as of *Caralluma*) I have had to depend mainly upon published and unpublished drawings and definitions.

1. **B. umbellata,** *Wight & Arn. Contrib.* 34; stem very stout, flowers in dense umbels, corolla glabrous. *Wight Ic.* t. 495; *Wall. Cat.* 8147; *Dcne. in DC. Prodr.* viii. 648. Stapelia umbellata, *Roxb. Cor. Pl.* iii. t. 241. S. Callamulia, *Ham.*

DECCAN PENINSULA; common in arid localities. CEYLON; rocks near Kornegalle, *Thwaites.*

Stem erect or ascending, simple or sparingly branched, 1–2 ft. high, 1–2 in. across the obtuse thick crenate angles. *Umbels* 2–4 in. diam., globose, dense-fld. *Corolla* 1–1¼ in. diam., streaked closely concentrically with purple. *Follicles* 4–7 in. long by ⅓ in. diam. *Seeds* ½ in. long, oblong.

? VAR. *campanulata*; angles of stem thin, corolla smaller without the purple streaks more tubular. B. campanulata, *Wight Ic.* t. 1287.—Wight distinguishes this as above, but Thwaites unites it with *umbellata*, and in the Herbarium they are indistinguishable, except by the smaller flower and narrower lobes of the corona; its native locality is unknown.

2. **B. crenulata,** *Wight & Arn. Contrib.* 34; stems very stout, flowers in dense umbels, corolla with long scattered hairs over the whole inner surface.

Dcne. in DC. Prodr. viii. 648. B. lasiantha, *Wight Ic.* t. 1286. Caralluma crenulata, *Wall. Pl. As. Rar.* i. 6, t. 7.

DECCAN PENINSULA; Nuggur hills, near Madras, *Wight.*—DISTRIB. Ava.

Apparently similar in habit to *B. umbellata,* differing chiefly in the hairy inner surface of the corolla.

3. **B. diffusa,** *Wight Ic.* t. 1599; diffuse, branches very stout, flowers in dense umbels, corolla-lobes fimbriate on the margin only.

TRAVANCORE; arid rocks, alt. 2000 ft., *Wight.*

"The very diffuse habit, a single plant covering many square feet of surface, the minute cauline teeth, small sepals, and distinctly tubular corolla of this plant, combine to mark the species as very distinct from any of its Indian congeners," *Wight l.c.*

4. **B. Hitchinia,** *Dcne. in DC. Prodr.* viii. 649; stem slender diffusely branched, flowers few in an umbel, corolla hairy within. Hitchinia indica, *Wight & Arn. Contrib.* 35; *Wight Ic.* t. 355; *Wall. Cat.* 8148.

The CARNATIC and CIRCARS, *Wight,* &c.

Branches $\frac{1}{3}$ in. diam. *Flowers* shortly pedicelled. *Corolla* $\frac{3}{4}$ in. diam. *Coronal lobes* shorter than in *B. umbellata,* inner process larger in proportion and decurrent.

5. **B. pauciflora,** *Wight mss.*; *Dcne. in DC. Prodr.* viii. 648; stems slender diffusely branched, teeth or angles recurved, flowers solitary, corolla hairy within.

SOUTH CARNATIC; at Palamcottah, *Wight.*

I have an unpublished lithograph of this plant made for Dr. Wight, and there are specimens in his Herbarium, but not sufficient for full analysis; the stems are as slender as in *B. Hitchinia,* the corolla campanulate, 1$\frac{1}{2}$ in. diam. with broad short acute lobes banded closely with purple, and the inflexed process from the corona is short and very broad.

6. **B. Aucheriana,** *Dcne. in DC. Prodr.* viii. 649; stem short branched, flowers capitate, corolla-lobes lanceolate glabrous pustular above. *Boiss. Fl. Orient.* iv. 63.

Dry hills in the WESTERN PUNJAB; the Saltrange, &c.—DISTRIB. Affghanistan, Beloochistan, Persia, Arabia.

Plant 2–6 in. high; branches $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Sepals* ovate-lanceolate. *Corolla* $\frac{1}{3}$ in. diam., dark purple, more deeply divided into narrower lobes than in any of the southern species. *Follicles* 3–4 in., tips capitate.

ORDER XCVI. **LOGANIACEÆ.** (By C. B. Clarke.)

Trees, shrubs or herbs. *Leaves* opposite (rarely ternate), undivided; stipules various or 0. *Inflorescence* cymose, terminal or axillary, simple or compound; cymes sometimes subcapitate, sometimes reduced to solitary flowers. *Flowers* regular. *Calyx* inferior, small, 4–5-toothed or -lobed. *Corolla* 4–5-lobed or -partite. *Stamens* 4–5, inserted on the corolla-tube, alternate with the lobes; anthers 2-celled. *Ovary* free, 2-celled; style simple, stigma capitate bifid or 2-partite; ovules one or more in each cell, placentæ on the dissepiment or basal in the inner angle. *Fruit* capsular septicidal, or baccate indehiscent, 1–∞-seeded. *Seeds* various, albumen copious; embryo straight, long or short.—Species 350, tropical and subtropical.

TRIBE I. **Euloganieæ.** *Ovary* with many ovules in each cell.

* *Herbs; corolla valvate; capsule compressed, didymous.*

Cymes 2–3-chotomous. *Corolla* 5-lobed . . . . 1. MITREOLA.
Pedicels solitary or clustered. *Corolla* 4-lobed . . . . 2. MITRASACME.

** *Shrubs or trees.*

Corolla imbricate. *Capsule* 2-valved. . . . . 3. BUDDLEIA.
Corolla valvate. *Capsule* 2-valved . . . . 5. NORRISIA.
Corolla contorted. *Fruit* indehiscent. . . . . 4. FAGRÆA.
Corolla valvate. *Fruit* indehiscent . . . . 6. STRYCHNOS.

TRIBE II. **Gaertnerieæ.** *Ovary* with 1 ovule in each cell.

Corolla tubular. *Anthers* nearly included in the tube . . . . 7. GAERTNERA.
Corolla subrotate. *Anthers* large, exserted . . . . 8. GARDNERIA.

1. **MITREOLA,** *Linn.*

Herbs. *Leaves* opposite, membranous; stipules membranous or small. *Cymes* 2–3-chotomous, terminal or peduncled, axillary. *Flowers* small, white, often unilateral on the ultimate cyme-branches. *Sepals* lanceolate. *Corolla* urn-shaped; lobes 5, small, valvate. *Stamens* 5, included. *Ovary* 2-celled; styles 2, short, connate under one small hairy stigma, ultimately divergent; ovules many in each cell, placentas peltate. *Capsule* obovoid, laterally compressed, truncate or 2-horned; carpels dehiscing by separating from each side of the septum from above. *Seeds* very many, minute, globose or elongate, albumen fleshy; embryo linear.—Species 4; 2 American and the following.

1. **M. oldenlandioides,** *Wall. Cat.* 4350; leaves oblong nearly glabrous, cymes terminal and axillary 2-chotomous, capsule 2-horned, seeds elongate trigonous, *A. DC. Prodr.* ix. 9; *Dalz. & Gibs. Bomb. Fl.* 155; *Hook. Ic. Pl.* t. 827; *Benth. in Journ. Linn. Soc.* i. 91. M. paniculata, *Wall. Cat.* 4349; *Wight Ic.* t. 600 (*flowers of principal figure inaccurate*); *A. DC. l. c.* (*as to the Asiatic plant*). M. inconspicua, *Zoll. et Mor. Verz.* (1845–6) 55.

CENTRAL PROVINCES, alt. 0–3000 ft.; extending to Bombay and to Chota Nagpore, frequent. PEGU; *J. Anderson.* DISTRIB. Burma, Malaya, N. Australia.

Annual, 6–18 in., erect. *Leaves* 2 by $\frac{3}{4}$ in., narrowed at both ends; petiole $\frac{1}{4}$ in. *Cymes* 2–6 in., often numerous; bracts $\frac{1}{16}$ in., lanceolate. *Flowers* subsessile, scarcely $\frac{1}{16}$ in. *Capsules* $\frac{1}{8}$ in., unilateral on the branches. *Seeds* twice as long as broad. The American *M. petiolata* united with this by A. DC. is exceedingly like it, but has globose seeds.

2. **M. pedicellata,** *Benth. in Journ. Linn. Soc.* i. 91; leaves oblong hairy beneath, cymes on long axillary peduncles 3-chotomous, capsule truncate, seeds globose tuberculate. Parophiorrhiza khasiana, *Clarke; Hook. f. Fl. Brit. Ind.* iii. 85.

KHASIA MTS., alt. 4200 ft.; Cherra, Limestone Hill, *Griffith, J. D. H., Clarke.*

Perennial, 2–8 in., decumbent, branching. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., narrowed at both ends; petiole $\frac{1}{3}$ in. *Cymes* 6–12-flowered, lax, irregular, peduncle 1–3 in. *Flowers* nearly as of *M. oldenlandioides*, obscurely unilateral, fruiting pedicels sometimes $\frac{1}{12}$–$\frac{1}{6}$ in., but not longer than sometimes in *M. oldenlandioides*. *Capsules* $\frac{1}{12}$ in., succulent, little compressed.—The specimens on which the genus *Parophiorrhiza* were founded, were mislaid when the Rubiaceæ were described for this work.

2. **MITRASACME,** *Labill.*

Small herbs. *Leaves* opposite, stipules forming a minute sheath. *Flowers* small, white, terminal or axillary, solitary clustered or in irregular umbels.

Calyx campanulate, 4-fid. *Corolla* urn-shaped; lobes 4, valvate. *Stamens* 4, included; anthers ovate. *Ovary* 2-celled; styles 2, connate, separating from the base upwards, usually finally divergent, stigma capitate or 2-lobed; ovules many in each cell, placentæ peltate. *Capsule* subglobose, laterally sub-compressed, truncate or sub-2-horned; carpels dehiscing by separating from each side of the septum from above. *Seeds* very many, minute, subglobose, testa smooth, reticulated.—Species 28; from Bengal to Japan and New Zealand, common in Australia.

1. **M. nudicaulis,** *Reinw. in Blume Bijd.* 849; leaves subradical elliptic minutely hairy, scapes terminated by a lax simple or compound umbel. *A. DC. Prodr.* ix. 12; *Benth. in Journ. Linn. Soc.* i. 92. M. chinensis, *Griseb. in Pl. Meyen.* 51; *A. DC. l. c.* 560.

KHASIA and JAINTEA MTS., alt. 4000 ft., frequent.—DISTRIB. China, Malaya.

Annual. *Scape* 3–5 in., very slender. *Leaves* $\frac{1}{3}$ in., subsessile, obtuse or acute, minutely hispid-flocculose. *Pedicels* $\frac{1}{2}$–$1\frac{1}{2}$ in., glabrous; bracts $\frac{1}{20}$ in., lanceolate. *Calyx* $\frac{1}{16}$ in., divided halfway down into acute lobes, glabrous. *Corolla* $\frac{1}{6}$ in., throat hairy. *Capsule* $\frac{1}{12}$ in. diam.

2. **M. alsinoides,** *Br. Prodr.* 453; leaves oblong acute glabrous, pedicels axillary solitary or 2–3 clustered in the upper axils. *A. DC. Prodr.* ix. 11. M. indica, *Wight Ic.* t. 1601; *Benth. in Journ. Linn. Soc.* i. 92. M. pusilla, *Dalz. in Hook. Kew Journ.* ii. 136; *Dalz. & Gibs. Bomb. Fl.* 155. M. crystallina, *Griff. Notul.* iv. 87, and *Ic. Pl. Asiat.* t. 383, *fig.* 2.

INDIA, alt. 0–2000 ft., widely scattered; ASSAM and BENGAL; CHOTA NAGPORE; DECCAN PENINSULA; PEGU and TENASSERIM. CEYLON.—DISTRIB. Borneo, Philippines, Australia.

Annual; stem 6 in., weak, branched, nearly glabrous. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in., sessile, scaberulous. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in., scaberulous. *Calyx* $\frac{1}{12}$ in., acutely lobed half-way down. *Corolla* $\frac{1}{5}$ in., throat hairy. *Capsule* $\frac{1}{10}$ in. diam.—The Bengal examples are lax straggling, exactly agreeing with the Malay and Australian; the Madras and Ceylon ones are shorter (2–3 in. high), suberect.

3. **M. polymorpha,** *Br. Prodr.* 452; stems patently glandular hairy below, leaves oblong, umbels terminal or from the upper axils, pedicels long unequal glabrous. *A. DC. Prodr.* ix. 10; *Benth. Fl. Austral.* iv. 353 *with syn.* M. capillaris, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* i. 420 and *Cat.* 4348; *Don Prodr.* 129; *A. DC. l. c.* 11; *Benth. in Journ. Linn. Soc.* i. 92. M. trinervis, *Spanoghe in Linnæa.* xv. 335; *A. DC. l. c.* 560. M. malaccensis, *Wight Ic.* t. 1601. Limnophila campanuloides, *Benth. in Wall. Cat.* 3908.

NEPAL; in the valleys, *Wallich.* PEGU to MALACCA, frequent. DECCAN PENINSULA; Mangalore, *Hohenacker*, n. 590. DISTRIB. China, Japan, Malaya, Australia.

Annual; stem 2–15 in., erect. *Leaves* $\frac{1}{2}$ by $\frac{1}{6}$ in., sessile, glabrous or pubescent. *Umbels* 1–8 in., compound or simple, capillary; pedicels $\frac{1}{4}$–$1\frac{1}{2}$ in. *Calyx* $\frac{1}{6}$–$\frac{1}{8}$ in., lobed acutely halfway down, ciliate pubescent or glabrous. *Corolla* $\frac{1}{4}$ in., throat hairy. *Capsule* nearly $\frac{1}{8}$ in.—The Pegu examples of *M. capillaris* are 14 in., and agree altogether with Australian ones named *M. polymorpha* by Bentham. The tropical Australian plant has larger capsules and is said to be perennial. The Nepal and Mangalore specimens are 3–4 in. high only, resembling the Japanese.

VAR. *Parishii*; umbels small dense long-peduncled, flowers large.—Tavoy; *Parish.* DISTRIB. Cochinchina. *Peduncles* 1–3 in., with a terminal umbel, and sometimes a sessile umbel in the middle; pedicels numerous, 0–$\frac{1}{5}$ in.—This is not much like any one of the numerous forms of the Australian *M. polymorpha*, but some of the Malay examples of *M. polymorpha* show a tendency to the Var. *Parishii.*

3. BUDDLEIA, *Linn.*

Trees, shrubs, or herbs. *Leaves* opposite, entire or crenate, united by a stipulary line. *Cymes* dense, globose or corymbiform, axillary or in a thyrsoid terminal panicle. *Calyx* campanulate, 4-merous. *Corolla* urn-shaped; lobes 4, imbricate in the bud. *Stamens* 4, on the corolla-tube; anthers subsessile, ovate or oblong. *Ovary* 2-celled; style linear, clavate; ovules very many in each cell. *Capsule* septicidally 2-valved. *Seeds* very many, oblong or fusiform, testa usually loose or expanded into a wing or tail, albumen fleshy; embryo straight.—Species 70, tropical and subtropical Asia, America, and Africa.

1. **B. Colvillei,** *Hook. f. Ill. Himal. Pl.* t. 18; sub-arboreous, leaves oblong acuminate crenate-dentate, cymes lax in large terminal panicles, flowers 1 in. crimson. *Gamble List Darjeeling Pl.* 56.

SIKKIM; frequent on Tonglo, alt. 9–12,000 ft., *J. D. H.*, &c.

A small tree 15–20 ft., or a large shrub. *Leaves* 6 by $1\frac{1}{2}$ in., attenuate at the base, densely rusty-woolly when young, obscurely pubescent when mature; petiole 0–$\frac{1}{4}$ in.; stipules small. *Panicles* 4–8 in., rusty-villous; pedicels 0–$\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in., shortly toothed, rusty-villous. *Corolla* tubular-campanulate, glabrous without; lobes short, round. *Ovary* hairy. *Capsule* $\frac{2}{3}$ by $\frac{1}{3}$ in. *Seeds* rhomboid-ellipsoid, testa lax little longer than the seed.

2. **B. macrostachya,** *Benth. in Wall. Cat.* 6407, and *Scroph. Ind.* 42, and in *DC. Prodr.* x. 447; shrubby, leaves oblong acuminate crenulate-dentate stipulate, spikes terminal elongate subpanicled, corolla narrow tubular fulvous-woolly without, seeds tailed. B. Martii, *T. A. Schmidt in Trimen Journ. Bot.* 1868, 245.

SIKKIM HIMALAYA, alt. 6000–7000 ft., Choongtam and Lachen, *J. D. H.* KHASIA MTS. alt. 3000–5000 ft. frequent.

Shrub 3–8 ft.; branches quadrangular upwards, woolly. *Leaves* 8 by 2 in., attenuate at the base, rusty-woolly beneath or ultimately brown-pubescent; petiole 0–$\frac{1}{2}$ in., stipulary line much developed often eared $\frac{1}{4}$ in. broad. *Spikes* 4–10 in., dense-fld., rusty-villous, usually continuous. *Calyx* $\frac{1}{8}$ in., campanulate; teeth lanceolate, acute. *Corolla* $\frac{1}{2}$ by $\frac{1}{8}$ in., white tinged with pink and yellow, throat orange. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in., oblong, acute, villous. *Seeds* elongate, testa lax 3–6 times as long as the nucleus, tailed at both ends.—The Sikkim plant does not essentially differ, but has a grey pubescence, the calyx is smaller, and almost a silvery white. "Flower very sweet, corolla-tube yellowish, limb patent blue, throat deep orange," *J. H. B. Martii* is described as having glabrous branches, which is never the case in our specimens.

VAR. *Griffithii*; corolla $\frac{1}{4}$ by $\frac{1}{16}$ in., capsule $\frac{1}{5}$ in.—Bhotan; *Griffith* (Kew Distrib. n. 3743). Mishmee; *Griffith* (Kew Distrib. nn. 3746, 3747). "Flowers lead-blue, throat orange," *Griffith.*

3. **B. paniculata,** *Wall. Cat.* 6403, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 412; shrubby, leaves ovate or oblong sinuate-dentate crenate or subentire, flower-heads in interrupted panicles, corolla narrow-tubular woolly, seeds ellipsoid not tailed. *Don Prodr.* 92; *Benth. Scroph. Ind.* 43, and in *DC. Prodr.* x. 444; *Brand. For. Fl.* 318; *Kurz For. Fl.* ii. 251. B. crispa, *Benth. in Wall. Cat.* 6404, and *Scroph. Ind.* 43; *Bot. Mag.* t. 4793; *T. A. Schmidt in Trimen Journ. Bot.* 1868, 245; *Boiss. Fl. Orient.* iv. 1198. B. nepalensis, *Colla*; *Benth in DC. l. c.* 447?

HIMALAYA, alt. 4–7000 ft., common westwards, becoming rare in Sikkim and Bhotan.—DISTRIB. Ava, Cabul Beloochistan. [The locality *Silhet* given by Mr. Bentham is believed to be erroneous.]

A shrub or small tree. *Leaves* 5 by 2 in., hastate, sinuate-dentate (on the flowering

branches usually much smaller, lanceolate, narrowed at the base, crenate or subentire), woolly beneath; petiole 0–¼ in.; stipules usually very narrow or obsolete. *Flower-heads* woolly. *Calyx* ⅛–⅙ in., urn-shaped, woolly, teeth short. *Corolla-tube* pink, lobes short lavender-blue, throat orange. *Style* short or long. *Capsule* ¼ in., ellipsoid, woolly. *Seeds* ellipsoid, testa lax scarcely longer than the nucleus.—*B. paniculata* was founded on the ends of the flowering branches with panicled heads and subentire oblong leaves; *B. crispa* on lower portions of the same branches with large hastate deeply sinuate-dentate leaves and flower-heads subsolitary on short axillary branches.

4. **B. asiatica,** *Lour. Fl. Cochinch.* 72; shrubby, leaves lanceolate acuminate entire crenate or toothed, spikes terminal and axillary often panicled, corolla ¼–⅓ in. tubular white, seeds not tailed. *Benth. in DC. Prodr.* x. 446; *Bot. Mag.* t. 6323; *Dalz. & Gibs. Bomb. Fl.* 180; *Bedd. For. Man.* 163, and *Anal. Gen.* t. 21; *Brand. For. Fl.* 318; *Kurz For. Fl.* ii. 250. B. Neemda, *Ham. in Wall. Cat.* 6401; *Roxb. Fl. Ind. ed. Carey & Wall.* i. 411; *Reich Ic. Bot. Exot.* t. 21; *Benth. Scroph. Ind.* 43, and in *DC. l. c.* B. discolor, *Roth Nov. Sp.* 83; *Benth. Scroph. Ind.* 42; *Wight Ill.* t. 165, *b.* v. and *Ic.* t. 894. B. salicina, *Lamk. Ill.* i. 291. B. acuminatissima, *Blume Bijd.* 743. B. serrulata, *Roth l. c.* 82. B. subserrata, *Don Prodr.* 92. B. virgata, *Blanco Fl. Filip.* 57.

Throughout INDIA, ascending to 6800 ft., very common; not known from Ceylon.—DISTRIB. Malaya, Cochin-China, and China.

A shrub, 3–6 ft., rarely subarborescent 15 ft. *Leaves* 5 by 1¼ in., usually narrowed at the base, grey white or fulvous-tomentose or pubescent beneath; petiole 0–½ in.; stipules narrow. *Spikes* 2–8 in., dense, usually continuous, fulvous or grey tomentose or pubescent. *Calyx* ⅛–⅙ in., campanulate, lobes triangular-oblong. *Corolla-tube* hairy without or glabrescent, lobes short. *Capsule* ¼ in., ellipsoid. *Seeds* ellipsoid, testa lax little longer than the nucleus.

4. FAGRÆA, *Thunb.*

Trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, entire (crenulate in *F. crenulata*); petioles dilated at base or united by a stipulary sheath. *Cymes* collected in corymbs racemes or elongate panicles, terminal or axillary; bracts small. *Flowers* large or small, white, yellowish or rarely pink. *Calyx* deeply 5-fid; lobes thick, broad, much imbricate. *Corolla-tube* long, narrow or funnel-shaped; lobes 5, broad, twisted to the left in the bud. *Stamens* 5, filaments filiform; anthers oblong. *Ovary* 2-celled, or 1-celled above; style filiform, stigma capitate; ovules very many in each cell. *Berry* 1–2-celled. *Seeds* very many, immersed in pulp, testa crustaceous, albumen horny; embryo small, straight.—Species 30; India, China, Japan, Malaya, and Australia, Pacific Islds.

* Cymes few-fld. (except *F. crenulata*), corymbose near the ends of the branches, flowers large.

† *Corolla-tube more than 3 in., linear, dilated only near the top.*

1. **F. carnosa,** *Jack in Mal. Misc.* ii. n. 7, 81; leaves obovate obtuse petioled, flowers solitary subsessile terminal, corolla-tube 5½ in. *DC. Prodr.* ix. 30; *Benth. in Journ. Linn. Soc.* ix. 97; *Kurz For. Fl.* ii. 204.

TENASSERIM; *Lobb, Kurz.*—DISTRIB. Sumatra.

An epiphytic shrub. *Leaves* 3 by 2 in., truncate-obtuse, mucronate, base cuneate; petiole ¼–⅓ in. *Calyx* ⅔ in.; lobes ⅓ in., ovate, much imbricated. *Corolla-tube* ½ in., mouth wide; lobes 1¼ in., obovate, obtuse, mucronate. *Berry* "size of a hen's egg, ovate, rather pointed" (*Kurz*).

2. **F. zeylanica,** *Thunb. Nov. Gen.* ii. 35; leaves obovate-oblong, corymbs terminal few-flowered, corolla-tube 3½ in. *Lamk. Ill.* t. 167, fig. 2; *Blume Rumph.* ii. t. 78, fig. 2; *DC. Prodr.* ix. 29; *Bot. Mag.* t. 6080. Solandra oppositifolia, *Moon. Cat.* 15.

CEYLON; central province, not common, *Rottler, Gardner, Thwaites.*

A small tree. *Leaves* 7 by 3 in., subobtuse, base much attenuate; petiole ⅕ in., or obscure. *Cymes* subsessile, 1–6-flowered; bracts ⅙ in., ovate; pedicels ¼ in. *Calyx* ½–⅔ in.; lobes ¼–⅓ in., ovate, obtuse. *Corolla-tube* ⅔ in., mouth wide; lobes 1¼ in., elliptic, obtuse. *Berry* 1½ by 1 in., ovoid, subacute.

VAR. *brevituba*; corolla-tube 1¼ in. *Wall. Cat.* 1594.—Deccan Peninsula, *Heyne.* —Differs only in the corolla-tube rather less dilated upwards.

†† *Corolla-tube less than 3 in. funnel-shaped at least in the upper half* (see also *F. zeylanica*, var. *brevituba*).

3. **F. auriculata,** *Jack in Mal. Misc.* ii. n. 7, 82; leaves obovate-oblong, cymes terminal few-fld., corolla-tube 2½ in., lobes 2½ in. *Wall. Cat.* 1596, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 34, and *Pl. As. Rar.* iii. 15, t. 229; *Blume Bijd.* 1020, and *Rumph.* ii. t. 72; *DC. Prodr.* ix. 29. F. auricularia, *Benth. in Journ. Linn. Soc.* i 98; *Kurz For. Fl.* ii. 204. F. imperialis, *Miq. in Ann. Mus. Lugd. Bat.* ii. 226, t. 5. Willughbeia auriculata, *Spreng. Syst. curæ post* 71.

TENASSERIM, MALACCA, and SINGAPORE; *Griffith, Helfer,* &c.—DISTRIB. Malaya.

A large shrub. *Leaves* 9 by 4 in., subobtuse, base cuneate or attenuate; petiole ¼–½ in., base auricled. *Cymes* 1–5-flowered, subsessile. *Calyx-lobes* 1 by ⅔ in. *Corolla-mouth* 2 in. wide; lobes 2 in. broad, obovate-oblong. *Berry* 2¾ by 1¼ in., oblong.—Griffith's examples have smaller flowers; Lobb's have the flowers nearly as large as in Miquel's picture.

4. **F. crenulata,** *Maingay ms.*; leaves large broadly obovate crenulate, cymes trichotomous rigid many-flowered, corolla-tube 1 in. funnel-shaped.

MALACCA; *Maingay.*

A tree 40 ft. high; trunk slender, unbranched (*Maingay*). *Leaves* 11½ by 8¼ in., obtuse, base narrowed; petiole ½ in., very thick. *Cyme* 6½ in. broad, depressed; peduncle 2 in.; bracts ⅕ in., ovate; pedicels ⅙–⅕ in. *Calyx-tube* ⅓ in.; lobes ¼ in., obtuse. *Corolla-mouth* ½–⅔ in. broad, wide campanulate for fully half its length; lobes ½ in., ovate-oblong. *Capsule* ¾ by ½ in., ellipsoid. *Seeds* very many.

5. **F. obovata,** *Wall. Cat.* 1595, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 33; leaves obovate-oblong or elliptic abruptly acuminate, stipules interpetiolar, cymes few–∞-flowered rigid, corolla-tube 1 in. upper half campanulate. *Blume Bijd.* 1021, and *Rumph.* ii. t. 75; *DC. Prodr.* ix. 29; *Bot. Mag.* t. 4205; *Griff. Notul.* iv. 35, and *Ic. Pl. Ind. Or.* t. 382; *Miq. Fl. Ind. Bat.* ii. 369; *Thwaites Enum.* 200; *Bedd. For. Man.* 164; *Kurz For. Fl.* ii. 205. F. crassifolia, *Blume Rumph.* ii. t. 78, fig. 1, and *Mus. Bot.* i. 166; *Thwaites Enum.* 200; *DC. l. c.* 30; *Miq. l. c.* 373; ? F. crassifolia, *Wall. Cat.* 1602. F. malabarica *and* obovato-javana, *Blume Rumph.* ii. 29, and *Mus. Bot.* i. 164; *Wight. Ic.* t. 1317. F. Blumei, *Steud.*; *DC. l. c.* 30. F. coromandeliana, *Wight Ic.* t. 1316; *Bedd. Fl. Sylv.* ii. t. 224. F. celebica, *Blume Mus. Bot.* i. 167. F. globosa, *Wall. Cat.* 1598; *DC. l. c.* 29. Willughbeia obovata, *Spreng. Syst. curæ post* 71.—*Rheede Hort. Mal.* iv. t. 58.

DECCAN PENINSULA and CEYLON, alt. 0–6000 ft., common. KHASIA MTS., alt. 0–4000 ft., *Wallich, Griffith, H. f. & T.* BHOTAN; *Gamble.* MALAY PENINSULA; from Pegu to Singapore, frequent.—DISTRIB. Malaya.

Trunk stunted in the Deccan, erect 30 ft. in the Malay Peninsula. *Leaves* 6½ by 3 in., base narrowed; petiole ¼–½ in.; stipules often partly free within the petiole,

embracing the branch. *Cymes* 1–5- (sometimes 12–15-) fld., subsessile; pedicels short. *Calyx* $\frac{2}{3}$ in.; lobes $\frac{1}{3}$ in., ovate, obtuse. *Corolla-throat* $\frac{3}{4}$–$1\frac{1}{4}$ in. wide; lobes 1–$1\frac{1}{3}$ in., broadly elliptic, obtuse. *Berry* $1\frac{1}{2}$ by 1 in.—Primary nerves of the leaves distinct in *F. obovata,* Wall., obscure in *F. crassifolia,* Blume. The corolla in Wallich's Silhet example is considerably larger than in his Singapore one. Fagræa crassifolia, *Wall. Cat.* 1602, is not in the Linnæan Herbarium.

VAR. *Gardneri*; scandent. F. Gardneri, *Thwaites Enum.* 200; *Bedd. For. Man.* 164.—Ceylon; central province, alt. 3–6000 ft., *Thwaites.* Thwaites says that this hardly differs from *F. obovata*, except in habit.

6. **F. khasiana,** *Benth. in Journ. Linn. Soc.* i. 96; leaves oblong-elliptic acuminate, cymes laxly trichotomous few-fld., corolla-tube $\frac{3}{4}$ in. funnel-shaped nearly from the base.

KHASIA MTS., alt. 0–5000 ft., *Griffith, H. f. & T.* ASSAM, *Griffith, Simons.*

A tree, 30 ft. *Leaves* as of *F. obovata.* *Cymes* 3–12-fld., branches lax, often nodding; bracts $\frac{1}{8}$ in., elliptic; pedicels 0–$\frac{1}{2}$ in. *Calyx* $\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in., ovate, obtuse. *Corolla-throat* $\frac{2}{3}$ in. wide; lobes $\frac{1}{2}$ in., broad-elliptic, obtuse. *Berry* $\frac{3}{4}$ by $\frac{2}{3}$ in.—Closely allied to *F. obovata,* having smaller flowers and fruits, and a much laxer inflorescence.

** Cymes short, few-flowered, in a more or less elongate raceme.

7. **F. Maingayi,** *Clarke*; leaves large oblong, calyx $\frac{1}{3}$ in. campanulate, corolla-tube $\frac{3}{4}$ in. widely funnel-shaped from the base.

MALAYA; Tamoosoo Kufoo, *Maingay.*

Leaves 11 by $4\frac{1}{4}$ in., parallel-sided, shortly acute at both ends; petiole $\frac{2}{3}$ in., very thick. *Peduncle* 3 in.; raceme 2 in., few-fld.; cymes subsessile on the rhachis of the raceme; pedicels $\frac{1}{3}$ in., thick, terete. *Calyx* nearly 5-partite; segments round. *Corolla-throat* $\frac{3}{4}$ in. wide; lobes $\frac{1}{2}$ in., subquadrate. *Berry* not seen.—This by its large calyx differs from all the species of this section except *F. crassipes,* Benth., which has a tubular corolla only slightly funnel-shaped upwards.

8. **F. racemosa,** *Jack.*; *Wall. Cat.* 1601, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 35; tree, leaves large oblong or elliptic base cuneate, racemes terminal condensed, calyx $\frac{1}{4}$ in., corolla-tube $\frac{2}{3}$ in. lower half cylindric, upper half campanulate. *DC. Prodr.* ix. 29; *Benth. in Journ. Linn. Soc.* i. 99; *Kurz For. Fl.* ii. p. 205. F. coarctata, *Blume Rumph.* ii. 33, and *Mus. Bot.* i. 170. Willughbeia racemosa, *Spreng. Syst. curæ post.* 71.

PENANG and MALACCA, *Wallich, Griffith, Maingay.*

Attains 50 ft. *Leaves* $10\frac{1}{2}$ by $3\frac{1}{2}$ in., nerves distinct; petiole $\frac{1}{3}$ in. *Peduncle* $1\frac{1}{2}$ in.; raceme $1\frac{1}{3}$ in.; pedicels $\frac{1}{8}$ in., subfascicled on the rhachis. *Calyx* divided more than halfway down; lobes round. *Corolla-throat* $\frac{1}{2}$ in. wide; lobes scarcely $\frac{1}{3}$ in., round. *Berry* "$\frac{1}{2}$ in., ovoid," *Kurz.*

9. **F. morindæfolia,** *Blume Rumph.* ii. 79, and *Mus. Bot.* i. 169; a rambling shrub, leaves large oblong or elliptic base rounded, racemes terminal elongate, calyx $\frac{1}{4}$ in., corolla-tube $\frac{2}{3}$ in. upper half campanulate or funnel-shaped. *DC. Prodr.* ix. 29. F. appendiculata, cuspidata *and* robusta, *Blume Mus. Bot.* i. 169, 170. F. Thwaitesii, *F. Muell. Fragm. Phyt. Austral.* ii. 137. Kuhlia morindæfolia, *Reinw. in Blume Bijd.* 777. Kentia morindæfolia, *Steud. Nomencl. Bot.* 2nd ed. i. 845. Utania morindæfolia, *G. Don Gen. Syst.* iv. 663.

ANDAMAN ISLDS., *Kurz.*—DISTRIB. Malaya, to the Philippines and Australia.

Panicle usually 8–14 in. long; lateral branches rarely simple.—Very near *F. racemosa*, Jack, and reduced to it by Benth. (*Fl. Austral.* iv. 367). As to *F. volubilis,* Jack (*Wall. Cat.* 1610, and in *Roxb. Fl. Ind.* ii. 36), it is a climber; the racemes weak, curved, axillary, sometimes 2 from the same axil, and seems nearer *F. racemosa* than the present species. The whole may be (as Bentham considers) one; but the *F.*

racemosa of the Malay Peninsula is well represented in the herbarium and uniformly differs from all the Malay *F. morindæfolia.*

10. **F. ligustrina,** *Blume Rumph.* ii. 33, and *Mus. Bot.* i. 171; leaves elliptic not very large, racemes terminal slender erect short, calyx $\frac{1}{6}$ in., corolla-tube $\frac{3}{4}$ in. narrowly funnel-shaped upwards. *Benth. in Journ. Linn. Soc.* i. 100.

SINGAPORE, *Lobb.*—DISTRIB. Malaya, Philippines.

Arborescent (*Blume*); branches round, slender. *Leaves* $4\frac{1}{2}$ by 2 in., suddenly acute, base broadly cuneate; petiole $\frac{1}{4}$ in. *Peduncle* 1 in.; raceme 1 in.; pedicels $\frac{1}{10}$ in., subfascicled on the nodes of the rhachis. *Calyx* divided halfway down; lobes round. *Corolla* much slenderer than in the preceding 3 species, $\frac{1}{12}$ in. wide below; throat scarce $\frac{1}{4}$ in. wide; lobes $\frac{1}{4}$ in., round.

*** Flowers small, in compound corymbs.

11. **F. fragrans,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 32; leaves elliptic acute, corymbs many-flowered, calyx $\frac{1}{12}$ in., corolla-tube $\frac{1}{3}$–$\frac{1}{2}$ in. upper half narrowly funnel-shaped. *Wall. Cat.* 1597; *Kurz For. Fl.* ii. 205. F. peregrina, *Blume Rumph.* ii. t. 80; *Field. & Gardn. Sert.* t. 6. Cyrtophyllum fragrans, *DC. Prodr.* ix. 31. C. peregrinum, *Reinw.*; *Blume Bijd.* 1022; *DC. l. c.*

From MARTABAN and ANDAMAN ISLDS. to SINGAPORE; frequent.—DISTRIB. Malaya.

A small tree, 25–30 ft. *Leaves* 4 by $1\frac{1}{4}$ in., shortly acute at both ends; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules often connate. *Corymbs* axillary towards the ends of the branches, often 50–100-flowered, sometimes 6–8-flowered; pedicels $\frac{1}{5}$ in. *Calyx* deeply divided, lobes round. *Corolla* subcylindric below; throat $\frac{1}{4}$ in. wide; lobes $\frac{1}{4}$ in., obtuse. *Stamens* much exserted. *Berry* " $\frac{1}{4}$ in., subglobose, reddish," *Kurz.*

12. **F. Wallichiana,** *Benth. in Journ. Linn. Soc.* i. 98; leaves lanceolate, corymbs few-fld., calyx $\frac{1}{6}$ in., corolla-tube $\frac{3}{4}$ in. slender widened only towards the apex. F. lanceolata, *Wall. Cat.* 1599, *not of Blume.* Cyrtophyllum ? lanceolatum, *DC. Prodr.* ix. 31.

PENANG, *Wallich, Maingay.*

Leaves 4 by $1\frac{1}{3}$ in., acute at both ends; petiole $\frac{1}{3}$ in. *Corymbs* terminal and axillary, 3-fld. mostly where attached (but the detached flowers are very numerous sent by Maingay); pedicels $\frac{3}{4}$ in. *Corolla-tube* narrowly funnel-shaped from the middle upwards; throat $\frac{1}{4}$ in. wide; lobes $\frac{1}{3}$ in., elliptic, obtuse. *Berries* $\frac{1}{3}$ in., ellipsoid, subacute.—This seems very near *F. fragrans,* but has a larger calyx, corolla, and berry, while the corymb is more slender.

5. NORRISIA, *Gardn.*

A shrub; young parts pubescent. *Leaves* opposite; petioles dilated at the base, subconnate. *Cymes* dense, trichotomous, in terminal corymbs. *Flowers* small, white? *Calyx* small, 5-lobed. *Corolla-tube* narrow, cylindric; lobes 5, small, ovate, valvate. *Stamens* 5, on the corolla-throat, filaments filiform; anthers ovate. *Ovary* 2-celled; style filiform, stigma capitate; ovules in each cell very many. *Capsule* oblong, septicidally 2-valved; carpophore finally free. *Seeds* very many, testa lax 4–6 times as long as the linear caudate nucleus, albumen fleshy; embryo straight or curved.

1. **N. malaccensis,** *Gardn. in Hook. Kew Journ.* i. 327. Antonia Griffithii, *Wight. Ill.* ii. 172, t. 156 *b.*

MALACCA, *Griffith, Maingay.*—DISTRIB. Borneo.

Branchlets round, fulvous-villous. *Leaves* 3 by $1\frac{1}{2}$ in., shortly acute at both ends, fulvous-villous beneath or finally glabrescent except the midrib; nerves 7 pairs,

oblique, strong, secondary distinctly reticulate; petiole $\frac{1}{8}$ in. *Cymes* in dense heads $\frac{1}{2}$–$1\frac{1}{3}$ in. diam., villous or tomentose. *Calyx* $\frac{1}{30}$ in. *Corolla-tube* $\frac{1}{8}$ in., grey or fulvous hairy without; lobes $\frac{1}{12}$ in. *Capsule* $\frac{1}{8}$ by $\frac{1}{12}$ in., fulvous-tomentose, the 2 elliptic valves finally splitting again from their tops. *Seeds* minute.

6. **STRYCHNOS,** *Linn.*

Scandent shrubs with short tendrils, or trees. *Leaves* opposite, 3–5-nerved (except sometimes *S. potatorum*); scandent species bear short clavate tendrils in some of the axils, the adjacent leaf then often suppressed; in the subterminal axils both tendrils often developed, both the leaves and the point of the branch then generally suppressed, in which case the species has been said to produce terminal bifurcate tendrils. *Cymes* terminal or lateral; bracts small; flowers white or yellowish. *Calyx* small, 5–4-lobed. *Corolla* 5–4-fid; tube short or long or hardly any; lobes valvate. *Stamens* 5, on the corolla-tube, filaments short. *Ovary* 2-celled (or 1-celled above); style long or short or hardly any, stigma capitate or small or sub-2-lobed; ovules many in each cell. *Berry* globose or oblong, many- (or 2–1-) seeded. *Seeds* globose, discoid or oblong, albumen horny; embryo small.—Species 60; in the tropics of both hemispheres.

Strychnos grandis, Wall. Cat. 4454, is Anisophyllea grandifolia, *G. Henslow* (vol. ii. p. 442).
Strychnos sp. *Wall. Cat.* 7500, with subalternate leaves, is not of this Order.

* *Corolla-tube shorter than the calyx or hardly any.*

1. **S. hypogyna,** *Clarke*; leaves elliptic-lanceolate 3-nerved glabrous, cymes axillary sessile compound pubescent, petals 5 hardly connate, ovary hairy.

TENASSERIM; Mergui, *Griffith* (Kew Distrib. n. 3830).—DISTRIB. Borneo.
Tendrils 0 on the examples; branchlets glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., base broadly rhomboid; petiole $\frac{1}{4}$ in. *Cymes* 1–2 in.; pedicels hardly any. *Calyx* pubescent. *Petals* $\frac{1}{20}$ in., villous within. *Stamens* obscurely attached to the petals, sometimes persistent after the petals have gone, filaments sometimes villous; anther-cells oblong, glabrous or nearly so. *Ovary* hairy; style hardly any. *Fruit* not seen.

2. **S. acuminata,** *Wall. Cat.* 1593 *in part*; leaves ovate acute 5-nerved glabrous, cymes axillary weak minutely pubescent, petals 5 shortly connate, ovary hairy. *Kurz For. Fl.* ii. 166, *not of A. DC.*

TENASSERIM; *Wallich.* PEGU and SOUTH ANDAMAN ISLDS., *Kurz, Helfer* (Kew Distrib. 3728).
A large climber, with tendrils, *Kurz. Leaves* $4\frac{1}{2}$ by $2\frac{3}{4}$ in., base cuneate obtuse rounded or subcordate, marginal nerves distinct; petiole $\frac{1}{6}$ in. *Cymes* 1–2 in., subsessile, lax; pedicels 0–$\frac{1}{12}$ in. *Calyx* minutely pubescent. *Corolla* $\frac{1}{16}$ in.; petals free, glabrous fide *Kurz* (shortly connate and villous within in Helfer's). *Berry* $\frac{1}{2}$ in. diam., crustaceous, 1–2-seeded. *Seeds* $\frac{1}{3}$ in. diam., discoid.—Kurz's examples are in ripe fruit; Wallich's are leaves only; on his A sheet are two plants, one (*b*) with 5-nerved leaves is that taken up by Kurz.

3. **S. micrantha,** *Thwaites Enum.* 425; leaves elliptic acuminate sub-5-nerved glabrous, cymes axillary short dense minutely hairy, corolla-lobes 5 oblong 3–4 times longer than the tube, ovary glabrous.

CEYLON; not uncommon, *Thwaites* (C. P. 3720, 1866).
Tendrils often in pairs. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., widest often above the middle, base cuneate or obtuse, nerves not impressed above; petiole $\frac{1}{8}$ in. *Cymes* 1–2 in.; pedicels 0–$\frac{1}{12}$ in. *Calyx* minutely pubescent. *Corolla* $\frac{1}{10}$ in.; tube exceedingly short; lobes

villous within. *Anther-cells* oblong, sparingly villous or glabrous. *Style* as long as the ovary. *Berry* ½ in. diam., crustaceous, 1–2-seeded. *Seeds* ⅓ in. diam., discoid.—Thwaites says the ovary is villous, but it is absolutely glabrous in C. P. n. 3720. This is the only constant character to distinguish it from *S. colubrina.*

4. **S. colubrina,** *Linn. Sp. Pl.* 271 (*not of Wall., Wight or A. DC.*); leaves elliptic acute 3-nerved glabrous, cymes axillary small compound puberulous, corolla-lobes 5 oblong 2–3 times as long as the tube, ovary hairy upwards. *Benth. in Journ. Linn. Soc.* i. 101; *Thwaites Enum.* 201; *Dalz. & Gibs. Bomb. Fl.* 155. S. bicirrhosa, *Lesch.*; *Wall. Cat.* 1589, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 267; *A. DC. Prodr.* ix. 16. S. minor, *Blume Rumph.* i. 70; *A. DC. l. c.* 14.—*Rheede Hort. Mal.* vii. t. 5.

W. Deccan Peninsula, from the Concan to Cochin, frequent.

Tendrils often in pairs. *Leaves* 4 by 1¾ in., base cuneate or obtuse; nerves not impressed above, marginal pair obscure; petiole ¼ in. *Cymes* 1–2 in.; pedicels 0–$\frac{1}{12}$ in. *Calyx* puberulous. *Corolla* $\frac{1}{10}$ in., tube hardly longer than the calyx, lobes villous within. *Anther-cells* oblong, glabrous, or nearly so. *Ovary* glabrous below, fulvous-hairy upward; style as long as the ovary. *Berry* ⅔ in. diam., crustaceous, 1–2-seeded. *Seeds* ⅓ in. diam., discoid.—All authors previous to Bentham took Rheede Hort. Mal. viii. t. 24 as the type of Linnæus' *S. colubrina*, whereas Linnæus founds his *S. colubrina* on t. 5, which has totally different fruit, and on which Blume founded his *S. minor.* Hence the confusion of synonyms.

Var. *zeylanica*; leaves rhomboid cuneate at both ends coriaceous 5-nerved, ovary glabrous.—Ceylon; *Thwaites* C. P. 2516, &c. This is taken by Thwaites as *S. colubrina*, Linn.

5. **S. Dalzellii,** *Clarke*; leaves ovate acute 3-nerved glabrous, cymes very short dense axillary and terminal puberulous, corolla-lobes 5 oblong 2–3 times as long as the tube, ovary glabrous. S. axillaris, *Dalz. & Gibs. Bomb. Fl.* 155, *not of Colebr.*

W. Deccan Peninsula; Concan, Malabar and Bababoodan Hills; *Law, Dalzell, Ritchie.*

Scandent, *Ritchie*, no tendrils on the specimens. *Leaves* 4 by 1¾ in., widest near the cuneate or rounded base, coriaceous, nerves often impressed above; petiole ¼ in. *Cymes* ½–¾ in., subcapitate. *Calyx* puberulous. *Corolla* $\frac{1}{10}$ in., tube hardly longer than the calyx-lobes, villous within. *Anther-cells* ovate, hairy. *Style* as long as the ovary. *Berry* 1–1½ in. diam., crustaceous, many-seeded. *Seeds* ⅓ in. diam., discoid.

6. **S. Benthami,** *Clarke*; leaves short-petioled elliptic acute 3–5-nerved glabrous, cymes very short subcapitate axillary pubescent, corolla-lobes 4 ovate longer than the tube, ovary glabrous. S. minor, *Benth. in Journ. Linn. Soc.* i. 101; *Thwaites Enum.* 201, *not of Blume.*

Ceylon, frequent; *Thwaites*, &c.

Tendrils often present. *Leaves* 2 by 1 in., base obtuse or rounded, secondary nerves distinct; petiole scarcely ⅛ in. *Cymes* ⅓ in. diam.; pedicels hardly any. *Calyx* glabrous, margin puberulous. *Corolla* $\frac{1}{10}$ in., villous within. *Anther-cells* ovate, hairy. *Style* as long as the ovary. *Berry* ⅓ in. diam., crustaceous, 1–2-seeded. *Seeds* ¼ in. diam., discoid.—The 5-merous species referred to by Bentham is *S. micrantha*, Thwaites. *S. minor*, Blume, is founded on *Rheede Hort. Mal.* viii. t. 24, which has totally different fruit.

Var. *parvifolia*, Benth. in Journ. Linn. Soc. i. 101; leaves ¾ by ½ in. coriaceous with recurved margins.—Ceylon, *Gardner*, &c.

7. **S. Rheedei,** *Clarke*; leaves short-petioled elliptic acute 3-nerved, cymes small peduncled few-fld. lax, corolla short-tubed 5-merous, berry very

large, many-seeded. S. colubrina, *Blume Rumph.* i. 70; *A. DC. Prodr.* ix. 14, *not of Linn. nor Wall.—Rheede Hort. Mal.* viii. t. 24.

MALABAR; *Rheede.*

Tendrils present; branches stout. *Leaves* 3½ by 1¾ in., base obtuse or rounded; petiole ⅛–⅙ in. *Peduncles* ½ in., axillary, 3–4-flowered; pedicels ⅛–⅓ in. *Berry* 2¼ in. diam., globose. *Seeds* ¾ in. diam., circular, discoid.—Only known from Rheede's figure, which may be incorrect as to the flowers. It appears from Roxb. Fl. Ind. ed. Carey & Wall. ii. 264, and from Beddome, that there probably exists a stout scandent species in Malabar with fruit like *S. Nux-vomica.* (See 16, *S. cinnamomifolia.*)

8. **S. Maingayi,** *Clarke*; leaves elliptic acute 3-nerved glabrous, cymes large dense very many-fld., corolla-lobes 5 linear-oblong 5 times as long as the tube, ovary hairy upwards.

MALACCA, *Maingay* (Kew Distrib. nn. 1041, 1042).

Branches glabrous; tendrils 0 (in the examples). *Leaves* 4¼ by 2 in., base obtuse; petiole ⅕ in. *Cymes* 4 in., divided from the base, nearly glabrous 100–300-flowered. *Calyx* glabrous, margin obscurely pubescent. *Corolla* ⅛ in., throat villous, tube hardly any. *Filaments* linear; anther-cells ovate, hairy. *Style* twice as long as the ovary. *Berry* not seen.

VAR. ?*fructuosa*; bearing tendrils, berry 2¼ in. diam. globose, rind thick, seeds many ⅔ by ⅓ in. oblong-ellipsoid, testa silky, albumen horny, embryo small.—Penang; *Maingay* (Kew Distrib. n. 1038). This may be the fruiting state of *S. Maingayi,* or of some totally different species. The seeds closely resemble those of *S. Ignatii.* Bergius (*Bentl. & Trim. Medic. Pl.* t. 179).

** *Corolla-tube longer than the calyx, not much longer than its lobes.*

9. **S. laurina,** *Wall. Cat.* 1591; leaves lanceolate or ovate-lanceolate 3-nerved glabrous, cymes large compound fulvous-pubescent, ovary hairy upwards, berry 1 in. diam. globose 1–2-seeded. *A. DC. Prodr.* ix. 13; *Benth. in Journ. Linn. Soc.* i. 102; *Kurz For. Fl.* ii. 166. S. ovatifolia, *Wall. Cat.* 1592; *A. DC. l. c.*; *Benth. l. c.* 103.

CACHAR; *Keenan.* PEGU and TENASSERIM to SINGAPORE, common; *Wallich, Griffith,* &c.—DISTRIB. Burma, Malaya.

Tendrils often in pairs; branchlets glabrous. *Leaves* 5 by 2 in., lanceolate, or in *S. ovatifolia,* Wall. 5 by 2½ in. and ovate-lanceolate, 3- or sub-5-nerved; petiole ¼ in. *Cymes* 2–5 in., axillary and terminal, sessile (or in *S. ovatifolia* peduncled); pedicels 0–$\frac{1}{16}$ in. *Calyx* glabrous, or margin obscurely pubescent. *Corolla* ⅙ in., villous within; tube rather longer than the lobes. *Anther-cells* oblong, slightly hairy. *Style* much longer than the ovary, hairy downwards.—There are no tendrils on Wallich's example of *S. ovatifolia,* which Mr. Bentham considers, though imperfect, to indicate a distinct species.

10. **S. septemnervis,** *Clarke*; leaves elliptic acute 5–7-nerved glabrous, cymes stout large fulvous-pubescent, ovary hairy, berry 1 in. diam. globose 1-seeded.

MALACCA; *Maingay* (Kew Distrib. n. 1036).

Scandent, *Maingay.* *Leaves* 4 by 2¼ in.; petiole ⅕ in. *Cymes* 2–5 in., sessile, very many-fld. *Calyx* puberulous. *Corolla* ⅕ in., villous within; tube about as long as the lobes. *Anther-cells* oblong, hairy. *Style* longer than the ovary, hairy downwards.—Perhaps only a large-flowered variety of *S. laurina,* but the nervation of the leaves differs considerably.

11. **S. Beddomei,** *Clarke*; leaves elliptic acute 3-nerved glabrous, cymes small fulvous-pubescent, ovary hairy, berry ½ in. diam. globose 1–2-seeded. S. laurina, *Thwaites Enum.* 201. S. colubrina, *Wall. Cat.* 4455, *second sheet only.*

TRAVANCORE; *Beddome.* CEYLON; *Thwaites.*

Tendrils often in pairs; branchlets glabrous. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{2}$ in., base obtuse, rarely obscurely 5-nerved; petiole $\frac{1}{5}$ in. *Cymes* $\frac{1}{2}$–$1\frac{1}{2}$ in., sessile; pedicels $\frac{1}{10}$–$\frac{1}{5}$ in. *Calyx* puberulous. *Corolla* $\frac{1}{8}$ in., villous within; tube rather longer than the lobes. *Anther-cells* oblong, glabrous or nearly so. *Style* longer than the ovary, hairy downwards.—This differs from *S. laurina* in the small cymes, pedicelled flowers, and much smaller berry. It seems more closely allied to *S. colubrina*, Linn., from which it only differs by the longer corolla-tube.

VAR. *coriacea*; leaves coriaceous, petiole $\frac{1}{10}$ in. *S. coriacea*, Thwaites Enum. 425. —Ceylon; *Thwaites.*

12. **S. malaccensis,** *Benth. in. Journ. Linn. Soc.* i. 101; leaves ovate acute 5-nerved glabrous, cymes small subcapitate shortly peduncled fulvous-pubescent, ovary glabrous. S. Gautheriana, *Pierre ms. in Herb. Kew.*

TENASSERIM or ANDAMANS; *Helfer.* MALACCA; *Griffith.*—DISTRIB. Cambodia.

Tendrils present; branchlets puberulous. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., base obtuse; petiole $\frac{1}{5}$ in. *Peduncles* $\frac{1}{4}$–$\frac{3}{4}$ in.; cymes $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; pedicels hardly any. *Calyx* puberulous. *Corolla* $\frac{1}{8}$ in., villous within, tube shorter than the lobes. *Anther-cells* ovate, densely hairy. *Berry* not seen.—Easily distinguished by the perfectly glabrous ovary and style, and densely hairy anthers.

13. **S. axillaris,** *Colebr. in Trans. Linn. Soc.* xii. 356, t. 15; leaves elliptic acuminate 3-nerved glabrous, cymes small subcapitate sessile pubescent, ovary glabrous. *Wall. Cat.* 1587; *A. DC. Prodr.* ix. 13; *Benth. in Journ. Linn. Soc.* i. 101.

KHASIA MTS., alt. 3–4000 ft; *Wallich, Griffith, H. f. & T.*

Tendrils present; branchlets puberulous. *Leaves* $2\frac{1}{2}$ by 1 in., base obtuse; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. *Cymes* $\frac{1}{4}$–$\frac{3}{4}$ in.; pedicels hardly any. *Corolla* $\frac{1}{8}$ in., villous within, tube shorter than the lobes. *Anther-cells* oblong, somewhat hairy. *Berry* not seen.—Very near *S. malaccensis*; the leaves are smaller more acuminate, the cymes sessile or very nearly so, the anther-cells not acute upwards.

14. **S. pubescens,** *Clarke*; leaves ovate acute 3–5-nerved hairy beneath, cymes small axillary dense, ovary glabrous, berry $\frac{1}{8}$ in. diam. globose 1-seeded.

MALACCA; *Maingay* (Kew Distrib. n. 1040).

Tendrils present; branches hairy. *Leaves* 2 by 1 in., base obtuse; petiole $\frac{1}{8}$ in. *Cymes* $\frac{1}{4}$–$\frac{3}{4}$ in. diam., sessile or nearly so, puberulous, pedicels hardly any. *Corolla* $\frac{1}{8}$ in., 5-merous, tube longer than the lobes, throat with a dense ring of hairs. *Anther-cells* subsessile below the ring of hairs, ovate, acute, apiculate, base only hairy. *Ovary* small, style hardly any. *Pericarp* crustaceous. *Seeds* $\frac{1}{4}$ in. diam., peltate, hemispheric.

15. **S. rufa,** *Clarke*; leaves elliptic acute 3–5-nerved rufous-hairy beneath, cymes dense axillary, berry $1\frac{1}{4}$ diam. globose many-seeded.

MALACCA; *Maingay* (Kew Distrib. n. 1034).

Branches patently rufous hairy, without tendrils (in the specimen). *Leaves* 4 by 2 in., base obtuse or subcordate, glabrescent above, harsh, scabrous; petiole $\frac{1}{8}$ in., rufous-hairy. *Cymes* $\frac{3}{4}$ in. diam., axillary, sessile, pubescent. *Flowers* not seen. *Seeds* compressed.

VAR. *Candollei*; leaves nearly glabrous beneath 3-nerved. *S. acuminata*, Wall. Cat. 1593 partly; A. DC. Prodr. ix. 14.—Amherst, *Wallich.*

*** *Corolla-tube linear, 5–10 times longer than the calyx.*

16. **S. cinnamomifolia,** *Thwaites Enum.* 201; leaves elliptic acute 3–5-nerved glabrous, cymes terminal short-peduncled many-fld., berry $1\frac{1}{2}$ in. diam.

globose many-seeded. S. colubrina, *Wall. Cat.* 1589, and *in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 264; *Wight Ic.* t. 434, *not of Linn.*

CEYLON; Hantani district, alt. 3000 ft., *Thwaites.*

Tendrils present; branchlets glabrous or nearly so. *Leaves* 4 by 2 in., base obtuse; petiole ¼ in. *Peduncles* ½–2 in.; cymes 1–2 in. diam., puberulous; pedicels hardly any. *Corolla-tube* ½ in., lobes less than ⅛ in. glabrous, a few hairs lower down the tube. *Anther-cells* oblong, glabrous. *Ovary* glabrous; style very long, glabrous; stigma large, capitate.—Altogether resembles *S. Nux-vomica,* but is scandent with tendrils. Though Rheede (*Hort. Mal.* viii. t. 24) represents the peduncles lateral and the buds subglobose, it may be suspected that Wallich and Wight were right in identifying that picture with their *S. colubrina.* If so *S. Rheedei* (n. 7 above) becomes a synonym of the present species.

17. **S. Wallichiana**, *Benth. in Journ. Linn. Soc.* i. 102; leaves oblong suddenly caudate 3-nerved shining, cymes terminal short-peduncled many-flowered. S. lucida, *Wall. Cat.* 1590 *partly.*

SILHET; Pundua, *Wallich.* ASSAM; Kufoo Forest, *Griffith* (Kew Distrib. n. 3726); Mikir Hills, *Simons.*

Tendrils often in pairs. *Leaves* 5½ by 1¾ in., parallel-sided, base broadly cuneate, 3 nerves very strong, 2 additional sometimes close to the margin very slender; secondary nerves very prominent, numerous, subparallel, nearly at right angles to the primary; petiole ⅕ in. *Cymes* and flowers as in *S. Nux-vomica* or *S. cinnamomifolia. Corolla* very villous in the throat. *Anther-cells* broadly oblong, obtuse. *Style* exsert stigma small. *Berry* unknown.—Wallich's n. 1590 includes this and *S. Nux-vomica,* whence Steudel's name *S. Wallichiana* applies to both; A. DC.'s *S. Wallichiana* (Prodr. ix. 13), from the ovate leaves and naked corolla-throat, seems described from one of Wallich's examples of *S. lucida* which have been since referred by Bentham to *S. Nux-vomica.* The broader shorter leaved specimens of this species, mentioned by Bentham, are those collected by *H. f.* & *T.* at the base of the Khasia Hills, without flower or fruit, and in which the lower leaves are ovate; they look like first year's shoots.

18. **S. Nux-vomica,** *Linn.*; *Roxb. Cor. Pl.* i. 8, t. 4, and *Fl. Ind. ed. Carey & Wall,* ii. 261; leaves ovate 5-nerved glabrous, cymes terminal short-peduncled many-fld., berry 1½ in. diam. globose many-seeded. *Gaertn. Fruct.* ii. t. 179, fig. 7; *Wall. Cat.* 1586; *A. DC. Prodr.* ix. 15; *Benth. in Journ. Linn. Soc.* i. 103; *Griff. Ic. Pl. Ind. Or.* t. 411; *Dalz. & Gibs. Bomb. Fl.* 155; *Bedd. Fl. Sylv.* t. 243; *Brand. For. Fl.* 317; *Benth. & Trim. Med. Pl.* t. 178 (syn. *S. colubrina, Wall. & Wight,* to be excluded from all authors); *Kurz For. Fl.* ii. 166. S. lucida, *Wall. Cat.* 1590, *partly.—Rheede Hort. Mal.* i. t. 37.

Throughout tropical INDIA, alt. 0–4000 ft.; rare in Bengal, common in Tenasserim and Madras.

A tree, attaining 40 ft. *Leaves* 3½ by 2 in., base obtuse; petiole ⅕ in. *Peduncles* ½–2 in.; cymes 1–2 in. diam., puberulous; pedicels hardly any. *Corolla-tube* ¼–½ in.; lobes less than ⅛ in. glabrous, a few hairs lower down the tube. *Anther-cells* oblong, glabrous. *Style* long, glabrous, stigma small capitate. *Seeds* ½ in. diam., discoid.—Bentham also reduces to the present species S. ligustrina (*Blume Rumph.* i. 68, t. 25), which does not differ by any tangible character, but has smaller, somewhat different-looking leaves.

19. **S. potatorum,** *Linn. f. Suppl.* 148; leaves elliptic subsessile glabrous or nearly so, cymes axillary nearly sessile, berry ⅓–⅔ in. diam. 1–2-seeded. *Roxb. Cor. Pl.* i. 9, t. 5, and *Fl. Ind. ed. Carey & Wall.* ii. 263; *Wall. Cat.* 1585; *A. DC. Prodr.* ix. 15; *Wight Ill.* ii. t. 156; *Benth. in Journ. Linn. Soc.* i. 103; *Dalz. & Gibs. Bomb. Fl.* 156; *Bedd. For. Man.* 163; *Brand. For. Fl.* 317; *Kurz For. Fl.* ii. 167. S. Tettankotta, *Retz. Obs.* ii. 12; *Gaertn. Fruct.* i. 477, t. 179.

DECCAN PENINSULA, extending north-west to the Sone river. PROME; *Kurz.* CEYLON frequent.

A tree, attaining 40 ft. *Leaves* 2½ by 1 in., acute at both ends, hardly acuminate, 3-nerved from the base or more often the lateral nerves springing much higher, or (as depicted by Roxburgh) sub-penninerved; petiole $\frac{1}{10}$ in. *Peduncles* 0–$\frac{1}{5}$ in.; cymes 1 in. diam., nearly glabrous; pedicels hardly any. *Corolla-tube* $\frac{1}{8}$–$\frac{1}{6}$ in., hardly twice as long as broad, hairy within, nearly glabrous in the throat; lobes $\frac{1}{12}$–$\frac{1}{10}$ in. *Anther-cells* oblong, glabrous. *Style* long, glabrous; stigma small, capitate. *Seeds* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., hemispheric, subpeltate, hardly discoid—*The clearing-nut.*

7. **GAERTNERA,** *Lamk.*

Trees or shrubs. *Leaves* opposite, rarely ternate, entire, coriaceous, feather-nerved; stipules connate into a cylindric sheath. *Cymes* terminal (axillary in *G. obesa*) many- (or 3–1-) flowered. *Calyx* small, funnel-shaped or campanulate. *Corolla-tube* longer than the calyx or elongate; lobes 5–4, valvate in bud. *Stamens* upon the corolla-tube; filaments short. *Ovary* 2-celled; style short or long, stigmas 2 linear or clavate; ovule 1 in each cell, erect. *Berry* didymous, subglobose, crustaceous. *Seeds* often compressed, albumen horny or fleshy; embryo small.—SPECIES 25; tropical Asia and Africa.

So closely resembling *Psychotria* (except for the inferior ovary) that it has been confounded therewith, and it has been proposed to append the genus to *Psychotria* as an aberrant section. Psychotria, *Wall. Cat.* 8341, without habitat, is a *Gaertnera*, but probably non-Indian.

1. **G. Koenigii,** *Wight Ic.* t. 1318; leaves elliptic or obovate-oblong shortly acuminate glabrous, panicles terminal trichotomous, calyx wide-funnel-shaped sub-truncate, corolla 5-merous tube about twice as long as the calyx, stigmas thick. *Benth. in. Journ. Linn. Soc.* i. 112; *Thwaites Enum.* 202; *Bedd. For. Man.* 164, and *Anal. Gen.* t. 21, fig. 3. G. thyrsiflora, *Blume Mus. Bot.* i. 174; *Benth. l. c.* 112. G. acuminata, *Benth. l.c.* G. Junghuhnii, *Miq. Fl. Ind. Bat.* ii. 383. Sykesia Koenigii and thyrsiflora, *Arn. Pug. Pl. Ind. Or.* 35; *DC. Prodr.* ix. 35. Psychotria vaginans, *DC. Prodr.* iv. 520; *W. & A. Prodr.* 434. —Psychotria sp., *Wall. Cat.* 8342, 8388.

SINGAPORE; *Wallich.* CEYLON; alt. 0–3000 ft., very abundant, *Thwaites*, &c.—DISTRIB. Malaya.

A large shrub. *Leaves* 6 by 2½ in., base narrowed; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Panicles* 2–6 in., pubescent or nearly glabrous, sometimes with leafy bracts below; pedicels 0–$\frac{1}{5}$ in. *Calyx* $\frac{1}{10}$ in. long and broad. *Corolla-tube* $\frac{1}{6}$ in., throat very villous. *Anther-cells* $\frac{1}{20}$–$\frac{1}{10}$ in., slightly exserted. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in., obovoid or subglobose.—The flowers are, as stated by Beddome, somewhat dimorphic.

VAR. *oxyphylla*; leaves smaller lanceolate acuminate, style short, stigmas small linear. Psychotria oxyphylla, *Wall. Cat.* 8374; *Benth. in Journ. Linn. Soc.* i. 112. —Singapore, *Wallich.* United with *G. Koenigii* by Thwaites; the differences in the stigma are probably sexual.

VAR. *divaricata*; panicle lax, pedicels divaricate, flowers rather smaller. G. divaricata and Pristidia divaricata, *Thwaites Enum.* 149 and 420.—Ceylon; *Thwaites.* United with *G. Koenigii* by Beddome, and it does not seem separable from some of the Ceylon *G. thyrsiflora* which has flowers smaller than usual in lax panicles.

2. **G. viminea,** *Hook. f. ms.*; leaves lanceolate caudate-acuminate glabrous, panicles terminal trichotomous, calyx very small substellate, corolla 4-merous tube 2–3 times as long as the calyx, stigmas linear. Psychotria viminea, *Wall. Cat.* 8354.

SINGAPORE; *Wallich.*

Branchlets terete, smooth. *Leaves* 3¼ by ¾ in., base cuneate; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.

Panicles 1–4 in., nearly glabrous; lowest bracts sometimes $\frac{1}{3}$ in., linear; pedicels hardly any. *Calyx* scarcely $\frac{1}{16}$ in. long and broad. *Corolla-tube* $\frac{1}{8}$ in., throat villous. *Berry* $\frac{1}{6}$ in., obovoid-globose.

3. **G. rosea,** *Benth. in. Journ. Linn. Soc.* i. 111; glabrous, leaves elliptic acuminate, flowers 1–3-nate, terminal subsessile, corolla 5-merous tube 3-4 times as long as the calyx glabrous in the throat. *Thwaites Enum.* 201.

CEYLON; *Walker*; ascending to 2000 ft.; *Thwaites.*

A shrub, 8–10 ft. *Leaves* $2\frac{1}{4}$ by 1 in.; base cuneate; petiole $\frac{1}{8}$ in.; stipular sheath crowned by two linear teeth. *Calyx* $\frac{1}{8}$ in., campanulate, subtruncate. *Corolla* rose-purple, tube $\frac{1}{2}$ in., hairy in the middle; lobes $\frac{1}{4}$ in., oblong. *Stamens* on the middle of the tube; anther-cells oblong, obtuse, included. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., subspherical, "pale blue," *Thwaites.*

4. **G. Walkeri,** *Wight Ill.* ii. 172, t. 156, *b.*; glabrous, leaves elliptic acuminate, panicles terminal trichotomous few-fld., calyx widely funnel-shaped, corolla 5-merous tube 2–3 times as long as the calyx glabrous in the throat, style very long, *Benth. in Journ. Linn. Soc.* i. 111, *partly*; *Thwaites Enum.* 202; *Bedd. For. Man.* 164. Sykesia Walkeri, *Arn. Pug. Pl. Ind. Or.* 36; *A. DC. Prodr.* ix. 35.

CEYLON, alt. 3–6000 ft.; *Walker*, &c.

A shrub, 8–10 ft. *Leaves* $2\frac{3}{4}$ by 1 in., base cuneate; petiole $\frac{1}{4}$ in. *Cymes* 3–12-fld.; bracts $\frac{1}{3}$ in. lanceolate; pedicels 0–$\frac{1}{8}$ in. *Calyx* $\frac{1}{8}$ in. long and broad; teeth small, triangular. *Corolla-tube* $\frac{1}{4}$ in., funnel-shaped upwards. *Stamens* inserted about the middle of the corolla-tube amidst hair. *Berry* spherical, "blue," *Thwaites.*—Resembles the smaller-leaved forms of *G. Koenigii forma thyrsiflora*, and does not much differ but by the stamens (with the ring of hairs) being situated lower down the corolla-tube, a point not properly shown in Wight's figure.

VAR. *Gardneri*; leaves $1\frac{3}{4}$ by $\frac{1}{3}$ in. linear-lanceolate, cymes 3–1-flowered obscurely pubescent, flowers rather smaller. G. Gardneri, *Thwaites Enum.* 202.—Ceylon.

5. **G. ternifolia,** *Thwaites Enum.* 212; leaves small linear often ternate, flowers solitary terminal, calyx-teeth lanceolate, berry $\frac{1}{3}$ in. wide didymous subglobose. G. Walkeri, var. angustifolia, *Benth. in Journ. Linn. Soc.* i. 111, *partly.*

CEYLON; near Adam's Peak, alt. 4–5000 ft.; *Thwaites.*

Branchlets minutely pubescent. *Leaves* $\frac{2}{3}$ by $\frac{1}{10}$ in. *Flowers* as *G. Walkeri* var. *Gardneri.*—Thwaites calls this a very beautiful and distinct species, but sends a specimen stated to be "an undoubted hybrid between *G. Gardneri* and *G. ternifolia*;" some of the leaves on his specimens of *G. Gardneri* (C. P. n. 363) are ternately whorled: Mr. Bentham considers all to be merely high-level forms of *G. Walkeri.*

6. **G. obesa,** *Hook. f. ms.*; leaves very large obovate-lanceolate glabrous, panicles dense axillary, calyx widely funnel-shaped, corolla-tube exceeding the calyx, lobes 5.—Psychotria obesa, *Wall. Cat.* 8328.

SINGAPORE; *Wallich, Walker, Maingay.*

Leaves 17 by $5\frac{1}{2}$ in., base tapering; petiole $1\frac{1}{2}$ in.; stipules $1\frac{1}{4}$ by $\frac{2}{3}$ in., ovate, acute, connate for half their length. *Panicles* 2–3 in., dense, obscurely pubescent, from the upper axils forming a quasi-thyrse. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. long and broad. *Corolla-tube* $\frac{1}{6}$–$\frac{1}{5}$ in., lobes $\frac{1}{5}$ in. *Stamens* near the base of the tube; anther-cells lanceolate-linear below the ring of hairs on the corolla-tube. *Style* short, linear, glabrous; stigmas linear, *Berry* not seen.

7. **G. grisea,** *Hook. f. ms.*; leaves large oblong acute hairy beneath, panicles terminal dense, corolla-tube grey-pubescent longer than the subtruncate calyx. Psychotria, *Wall. Cat.* 8389.

SINGAPORE; *Wallich.*

Branches softly hairy. *Leaves* $9\frac{1}{2}$ by $2\frac{3}{4}$ in., base cuneate or rounded; petiole $\frac{1}{3}$ in.; stipular sheath silky, $\frac{2}{3}$ in. long, crowned by 2–4 teeth. *Panicles* 1–3 in. diam. trichotomous, grey-pubescent; lower bracts sometimes leaflike; flowers clustered. *Calyx* $\frac{1}{8}$ in. long and broad, campanulate, grey-pubescent. *Corolla-tube* $\frac{1}{6}$ in., lobes $\frac{1}{6}$–$\frac{1}{5}$ in. *Anther-cells* narrow oblong, immersed in the dense hair in the upper part of the corolla-tube which hardly extends to the throat.—This and the preceding species are allied to *G. longifolia*, Bojer, and other large Mascarene species.

8. GARDNERIA, *Wall.*

Large, scandent, glabrous shrubs. *Leaves* opposite, entire; petioles connected by a stipulary line. *Peduncles* axillary, 1–∞-fld. *Calyx* small, deeply 4–5-lobed. *Corolla* subrotate; lobes 4–5, thick, valvate in bud. *Stamens* 4–5, on the corolla-tube; anthers subsessile, cells ovate, connivent or subconnate, erect, exserted. *Ovary* 2-celled; style cylindric, stigma shortly 2-lobed; ovules 1 in each cell, on the dissepiment. *Berry* globose, 2-celled. *Seed* compressed parallel to the septum, albumen fleshy; embryo small.—Species 2–3, Indian and Japanese.

1. **G. ovata,** *Wall. Cat.* 816, and *As. Pl. Rar.* iii. 17, t. 231, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 400; leaves elliptic acute, cymes trichotomous, corolla-lobes obtuse, anthers connate. *DC. Prodr.* ix. 20; *Benth. in Journ. Linn. Soc.* i. 109. G. Wallichii, *Wight*; *Wall. Pl. As. Rar.* iii. 49, t. 281; *Wight Ic.* t. 1313.

KHASIA MTS., *Wallich, H. f. & T.* NILGHERRY MTS., *Wight*, &c.

Leaves 3 by $1\frac{1}{4}$ in., base obtuse; petiole $\frac{1}{4}$ in. *Cymes* usually 1–2 in., 5–1-fld.; in the Nilgherry examples sometimes peduncled, and 12-fld.; in a Silhet one compound, panicled, 5–$6\frac{1}{2}$ in., and 90-flowered. *Calyx* $\frac{1}{20}$ in., lobes rounded. *Corolla-tube* hardly longer than the calyx; lobes $\frac{1}{6}$–$\frac{1}{4}$ in., patent, tomentose villous or subglabrate within. *Anthers* in a cylinder $\frac{1}{5}$ in. long. *Berry* $\frac{1}{3}$ in. diam., scarlet.—A single specimen in Herb. Hook. is marked "Ceylon, Mrs. Walker," but I suspect some error.

2. **G. angustifolia,** *Wall. Cat.* 817, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 318; leaves lanceolate acuminate, peduncles 1 (rarely 2)-fld., corolla-lobes acute, anthers free. *DC. Prodr.* ix. 20; *Benth. in Journ. Linn. Soc.* i. 109.

TEMPERATE HIMALAYA, alt. 5–7000 ft.; from Kumaon to Bhotan; *Wallich*, &c.

Leaves $4\frac{1}{4}$ by 1 in., base acute or rounded; petiole $\frac{1}{4}$ in. *Peduncles* nodding in flower. *Corolla-lobes* densely villous or nearly glabrous within. *Berry* $\frac{1}{3}$ in. diam., scarlet.—Closely allied to *G. ovata*, which Bentham reduces to the present species, with *G. nutans, Sieb. & Zucc.* from Japan, which has elliptic acute leaves and rather larger flowers; and may be a geographic form of *G. angustifolia.*

ORDER XCVII. GENTIANACEÆ. (By C. B. Clarke)

Herbs, rarely minutely hairy. *Leaves* opposite, rarely alternate, entire, or alternate and 3-foliolate in *Menyanthes*. *Flowers* cymose capitate or umbelled, rarely solitary, rarely bracteate, regular; irregular in *Canscora* and *Hoppea*. *Calyx* inferior, lobes 5–4 imbricate in bud. *Corolla* funnel-shaped or rotate, lobes twisted to the right, in *Menyanthes* induplicate-valvate. *Stamens* on the corolla-tube, as many as its lobes and alternate with them, or unequal or suppressed in *Canscora* and *Hoppea*; filaments linear, sometimes dilated

below; anthers oblong. *Disc* of 5 glands at the base of the ovary or 0. *Ovary* superior, 1-celled, or rarely only the placentæ intruded and meeting; style short or linear, simple, stigmas 2 small; ovules numerous. *Capsule* membranous, rarely fleshy and berried. *Seeds* numerous, small, sometimes winged; albumen copious.—Species 520, throughout the globe, more abundant in mountainous regions.

TRIBE I. **Exaceæ.** *Leaves* opposite. *Corolla-lobes* twisted to the right. *Ovary* completely 2-celled. *Style* filiform.

Leafless parasites, anthers dehiscing by terminal pores . . . 1. COTYLANTHERA.
Corolla blue, purplish or white . . . . 2. EXACUM.
Corolla yellow, anthers dehiscing by longitudinal slits . . . 3. SEBÆA.

TRIBE II. **Chironieæ.** *Leaves* opposite. *Corolla-lobes* twisted to the right. *Ovary* 1-celled. *Style* filiform.

Flowers regular in axillary clusters . . . . 5. ENICOSTEMA.
Flowers regular panicled or terminal subcapitate . . . . . 6. ERYTHRÆA.
Flower irregular, stigma scarcely divided, minute herbs . . . 4. HOPPEA.
Flower irregular, stigmas 2 . . . . 7. CANSCORA.

TRIBE III. **Swertieæ.** *Leaves* opposite, rarely alternate. *Corolla-lobes* twisted or imbricate. *Ovary* 1-celled. *Style* short, rarely elongate.

* *Corolla without pits or depressions near the base of its lobes* (viscid spots or hairy glands sometimes present).

Twiners, corolla tubular-campanulate . . . . 8. CRAWFURDIA.
Corolla tubular-campanulate, stamens attached on the tube. . 9. GENTIANA.
Corolla tubular-campanulate, stamens attached between its lobes . . . . 10. JAESCHKEA.
Corolla rotate, stamens attached at its base . . . . 11. PLEUROGYNE.

** *Corolla with* 1 *or* 2 *depressions pits or spurs near the base of each of its lobes.*

Depressions or pits of the corolla shallow. . . . . 12. SWERTIA.
Pits of the corolla prolonged into spurs . . . . 13. HALENIA.

TRIBE IV. **Menyantheæ.** Aquatic herbs, leaves radical or alternate. *Corolla-lobes* induplicate-valvate in the bud.

Leaves 3-foliolate. . . . . 14. MENYANTHES.
Leaves simple, cauline deeply cordate . . . . 15. LIMNANTHEMUM.

1. COTYLANTHERA, *Blume.*

Parasitic, small, glabrous herbs. *Leaves* scale-like, opposite. *Flowers* solitary or few, terminal. *Calyx* deeply 4-lobed. *Corolla* rotate; lobes 4, oblong. *Stamens* 4, on the corolla-tube, filaments linear; anther-cells oblong, slightly curved, dehiscing by 1–2 terminal pores. *Ovary* completely 2-celled; placentæ large; style filiform, stigma small capitate. *Capsule* globose, septicidally 2-valved. *Seeds* numerous.—Species 3, in the Himalaya, Java, and Ladrone Islands.

1. **C. paucisquama,** *Clarke in Herb. Calcutta*; pairs of scales on the stem 1–2 only.

SIKKIM; alt. 6000 ft., *King.*

Stem 2–4 in., white, fleshy. *Leaves* $\frac{1}{8}$ in., elliptic, white. *Calyx-lobes* $\frac{1}{8}$ in., oblong, white. *Corolla-lobes* $\frac{1}{3}$ in., linear-lanceolate, dark blue. *Filaments* $\frac{1}{8}$–$\frac{1}{6}$ in. *Anthers*

with two pores, *King*. *Style* ¼ in. *Fruit* not seen.—Cotylanthera tenuis, *Blume Bijd.* 708, and Eophylon Lobbii, *A. Gray in Journ. Linn. Soc.* xi. 23, differ chiefly by having numerous pairs of leaves on the stem; but all may be one species.

2. EXACUM, *Linn.*

Herbs, usually branched. *Leaves* ovate or lanceolate, usually 3–5-nerved. *Cymes* terminal and axillary. *Calyx* deeply 4–5-lobed; lobes keeled, winged, or flat. *Corolla* rotate; tube short, globose; lobes 4–5, ovate or oblong, blue purple-blue or white. *Stamens* 5–4, on the corolla-throat, filaments short; anthers large, oblong, apical pores at length extending usually to the base. *Ovary* more or less completely 2-celled; style long, stigma small subcapitate; placentæ large. *Capsule* globose, septicidally 2-valved. *Seeds* very many, minute, subcuboid, testa granular.—Species 20, mostly Indian; a few Malayan, Chinese, and African.

* Stem 4-angular (except *E. teres*); corolla large, lobes 4, blue.

1. **E. teres,** *Wall. Cat.* 4354, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 414; stem terete, leaves lanceolate 3-nerved, calyx subquadrangular hardly winged. *Griseb. Gentian.* 108, and in *DC. Prodr.* ix. 44; *Clarke in Journ. Linn. Soc.* xiv. 424.—Exacum sp., *Griff. Itin. Notes,* 71 n. 1098.

Tropical Himalaya, alt. 0–5000 ft.; from Nepal to Bhotan, frequent. Assam and Khasia Mts., alt. 0–4000 ft., frequent.

Stem 1–4 ft., hardly branched, sometimes with 2–4 obscure lines. *Leaves* 3½ by ¾ in., sessile or the lower petioled, acute. *Cymes* from the upper axils forming a lax long panicle. *Calyx-lobes* ¼ in. ovate, acute, with thickened green keels. *Corolla-lobes* ½ in., obovate-oblong, acute. *Anthers* ⅓ in. *Style* ½ in. *Capsule* ⅓ in., ovoid. —Reduced states occur at the higher levels.

2. **E. tetragonum,** *Roxb. Hort. Beng.* 10, and in *Fl. Ind. ed. Carey & Wall.* i. 413; stem quadrangular, leaves sessile broad-lanceolate 5-nerved, calyx-lobes ovate acuminate keeled scarcely winged, anthers ¼ in. straight. *Wall. Cat.* 4356, and *Pl. As. Rar.* iii. 47, t. 276; *Don Prodr.* 128, and in *Trans. Linn. Soc.* xvii. 531; *Arn. in Ann. Sc. Nat.* 2, xi. 175; *Griseb. Gentian.* 107, and in *DC. Prodr.* ix. 44; *Benth. Fl. Hongk.* 233; *Clarke in Journ. Linn. Soc.* xiv. 424. E. Hamiltonii, *G. Don Gen. Syst.* iv. 213. E. bellum, *Hance in Hook. Lond. Journ. Bot.* vii. 472.

N. India, ascending to 5000 ft., common from Kumaon to Central India, Bhotan, and the Khasia Mts.—Distrib. China.

Stem 1–4 ft., little branched below. *Leaves* 5 by 1½ in., acute, or 1½ by ¾ in., subobtuse. *Panicle* large and compound, or depauperated few-fld. *Buds* nearly straight, and corolla subsymmetric. *Calyx-lobes* ½–⅔ in., sometimes sub-3-winged. *Corolla-lobes* ¾ in., broadly elliptic, acute, full azure blue (not violet-purple as depicted by Wallich, nor golden yellow as stated by Don). *Style* ½ in. *Capsule* ⅓ in., subglobose.

Var. *stylosa*; leaves narrower, corolla smaller, anthers rather longer more attenuate. E. stylosa, *Wall. Cat.* 4355; *Griseb. in DC. Prodr.* ix. 46. E. chironioides, *Griseb. Gentian.* 109, and in *DC. Prodr.* ix. 45. E. Horsfieldianum, *Miq. Fl. Ind. Bat.* ii. 556. E. sulcatum, *Clarke in Journ. Linn. Soc.* xiv. 425, *not of Roxb.*—Burma; Prome, *Wallich*. Tenasserim; Mergui, *Griffith* (Kew Distrib. n. 5809); Pegu, *M'Clelland*; Malacca, *Lobb*.—Distrib. Malaya to Borneo and the Philippines.—A few flowers on the Pegu example are 5-merous.

3. **E. Perrottetii,** *Griseb. in DC. Prodr.* ix. 45; stem quadrangular, leaves sessile 5–7-nerved, calyx-lobes ovate-lanceolate keeled, anthers ⅓–½ in. straight. *Wight Ic.* t. 1322.

W. DECCAN PENINSULA; from the Concan southwards.

Stem 2–5 ft., subsimple below. *Leaves* 2–5 in., from oblong to subcordate-ovate. *Cymes* dense, forming a narrow interrupted panicle. *Calyx-lobes* $\frac{3}{4}$–1 in., narrowly (or not) winged. *Corolla-lobes* $1\frac{1}{2}$ in., ovate, acute. *Anthers* $\frac{1}{10}$–$\frac{1}{8}$ in. wide at the base. *Capsule* $\frac{1}{2}$ in., ovoid.—The finest species of the genus: in its straight buds and subsymmetric flowers it resembles *E. tetragonum* on a large scale.

4. **E. bicolor,** *Roxb. Catal. Pl.* (1813), and *Fl. Ind. ed. Carey & Wall.* i. 413; stem quadrangular, leaves sessile ovate-lanceolate 5-nerved, calyx-lobes ovate suddenly caudate, keel winged, anthers $\frac{1}{3}$–$\frac{1}{2}$ in. curved. *Wight Ic.* t. 1321; *Griseb. in DC. Prodr.* ix. 45; *Dalz. & Gibs. Bomb. Fl.* 156 (*syn. excl.*); *Clarke in Journ. Linn. Soc.* xiv. 425. E. grandiflorum, *Wall. Cat.* 4358; *Griseb. in DC. Prodr.* ix. 47. E. Metzianum, *Herb. Hohenacker,* n. 857. E. sulcatum, *Herb. Wight, not of Roxb.* E. tetragonum, β. tricolor, *Bot. Mag.* t. 4340.

DECCAN PENINSULA, frequent from the Concan and Orissa to Courtallum.

Considered by Mr. Bentham only a form of *E. tetragonum*, but differs from that (and the larger *E. Perrottetii*) in the unsymmetric flowers, the buds distinctly curved at the tips, and the anther-cells curved and tapering upwards. The calyx-lobes do not taper gradually as in *E. Perrottetii.* The flowers are larger than those of *E. tetragonum*, smaller than those of *E. Perrottetii.* The corolla-segments are (very generally) white in the lower half, full azure-blue in the upper.

5. **E. axillare,** *Thwaites Enum.* 203; stem quadrangular, leaves ovate-lanceolate 3-nerved thin succulent, flowers mostly solitary on axillary peduncles, calyx-lobes with a dorsal cordate-lanceolate reticulated wing, anthers $\frac{1}{5}$ in. straight shortly suddenly beaked.

CEYLON; in the Pasdoon Corle, *Walker, Thwaites.*

Stem 6–18 in., procumbent and branched or erect and simple. *Leaves* $2\frac{1}{2}$ by 1 in, base tapering, lower mostly long-petioled, very thin, dried reticulately nerved. *Peduncles* $\frac{1}{4}$–$\frac{3}{4}$ in., numerous, often from the lower axils; upper imperfectly corymbed. *Calyx-lobes* $\frac{1}{2}$ in.; wing (in young fruit) $\frac{1}{5}$ in. broad. *Corolla-lobe* $\frac{1}{2}$ in., lanceolate, acute, cyaneous (*Thwaites*). *Capsule* $\frac{1}{3}$ by $\frac{1}{5}$ in.

VAR. *pentamera*; corolla-lobes 5 broader shorter obtuser than in *E. axillare* type. —Ceylon, *Thwaites.*—A dubious plant, perhaps more nearly allied to *E. Walkeri,* but in the thin succulent leaves and cordate calyx-wings altogether resembling *E. axillare.*

** Corolla large or medium-sized, lobes 5 (all from the Deccan Peninsula or Ceylon).

6. **E. Walkeri,** *Arn. in Ann. Sc. Nat.* 2, xi. 176; leaves ovate or lanceolate acute 3-nerved, peduncles axillary solitary and terminal subcorymbose, calyx-lobes with an ovate-lanceolate dorsal wing, corolla-lobes $\frac{1}{2}$ in. broadly elliptic, anthers $\frac{1}{6}$–$\frac{1}{5}$ in. subtruncate. *Griseb. Gentian.* 110, and in *DC. Prodr.* ix. 45; *Wight Ill.* t. 157, *b.* fig. 1. E. ovale, *Griseb. Gentian.* 111, and in *DC. Prodr.* ix. 46; *Clarke in Journ. Linn. Soc.* xi. 426. E. foliosum, *Griseb. in DC. Prodr.* ix. 45. E. zeylanicum, *var.* β *only, Thwaites Enum.* 203.

CEYLON; *Walker,* &c.; central province, alt. 5000 ft., *Thwaites* (C.P. n. 38).

Stems 1–3 ft., suberect, often with long branches from near the base, quadrangular or obscurely 4-lineolate. *Leaves* (in the original *E. ovale*) 1 by $\frac{2}{3}$ in. ovate, acute, base rounded, subsessile (in Thwaites *E. zeylanicum,* var. β), $2\frac{1}{2}$ by $\frac{2}{3}$ in., lanceolate, acuminate at both ends. *Calyx-lobes* $\frac{1}{3}$ in., base of wing narrowed or rounded, rarely cordate. *Corolla-lobes* acute, white or pale blue. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in.—*E. ovale* of Griseb. has been reduced by Thwaites to *E. macranthum,* but the corolla-lobes are described by Grisebach as 8 mill. long, and it was doubtless = *E. Walkeri,* as is *E. ovale* of Wight's and Gardner's Herbarium. In this species 1-flowered peduncles from the lower axils are frequent.

7. **E. atropurpureum,** *Bedd. Ic. Pl. Ind. Or.* t. 119; leaves subsessile round-ovate shortly acute 5-nerved, flowers 5–1 terminal, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{4}$ in. E. Beddomei, *Clarke in Journ. Linn. Soc.* xiv. 427.

DECCAN PENINSULA; Quilon, *Gen. Cullen*; Pulney Mts., *Beddome.*

Stems erect, terete. *Leaves* $1\frac{1}{2}$ by 1 in., coriaceous. *Peduncles* $\frac{1}{2}$ in., solitary from the penultimate axils. *Calyx-lobes* $\frac{1}{3}$ in. *Corolla-lobes* obovate-oblong, acute, deep blue. *Capsule* oblong (*Beddome*).

VAR. *anamallayanum, Bedd. Ic. Pl. Ind. Or.* t. 154; leaves larger ovate or oblong acute or obtuse margined, flowers corymbose.—Anamallays and Pulneys, alt. 6–7000 ft., *Beddome.*

8. **E. courtallense,** *Arn. in Ann. Sc. Nat.* 2, xi. 176; stem quadrangular much branched, leaves lanceolate 3–1 nerved succulent sessile, corymbs terminal few-fld., corolla-lobes $\frac{1}{3}$–$\frac{1}{2}$ in., anthers $\frac{1}{5}$ in. shortly attenuate. *Griseb. in DC. Prodr.* ix. 47; *Wight Ic.* t. 1323.

S. DECCAN PENINSULA; Courtallum, *Wight.*

Stem often almost woody below, 3–8 in., densely ramous, or 14 in. with fewer longer branches. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in., narrowed below, nerves often obscure. *Peduncles* 0–$\frac{3}{4}$ in., often 1-flowered in the ramous form, corymbose in the less divided. *Calyx-lobes* $\frac{1}{3}$ in., wing oblong or lanceolate. *Corolla-lobes* obovate-oblong acute, blue. *Capsule* $\frac{1}{3}$ by $\frac{1}{5}$ in., ovoid.

VAR. *travancorica*; peduncles $\frac{1}{2}$–$1\frac{1}{2}$ in. solitary, flowers and capsule rather larger. *E. travancorica*, Bedd. Ic. Pl. Ind. Or. t. 118.—Travancore, alt. 5000 ft., *Beddome.*—The examples are only 2–7-fld. and look like alpine forms of *E. courtallense*, but Beddome says that *E. travancoricum* is sometimes 50-fld.

9. **E. Wightianum,** *Arn. in Ann. Sc. Nat.* 2, xi. 176; leaves elliptic-lanceolate 3–5-nerved, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{5}$–$\frac{1}{4}$ in. scarcely attenuated upwards. *Griseb. in DC. Prodr.* ix. 45; *Wight Ic.* t. 840. E. zeylanicum, *Wall. Cat.* 4357, *letter a.* E. foliosum, *Griseb. l. c.* 45.

NILGHERRY MTS., alt. 4–7000 ft., frequent. TRAVANCORE, *Beddome.*

Only differs from *E. zeylanicum* in the much shorter anthers, which have a minute papilla at the summit of the connective behind.

10. **E. zeylanicum,** *Roxb. Catal. Pl.* (1813), and *Fl. Ind. ed. Carey & Wall.* i. 414; leaves elliptic-lanceolate 3–5-nerved, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{3}$–$\frac{1}{2}$ in. attenuated upwards. *Wall. Cat.* 4357, *letter b*; *Arn. in Ann. Sc. Nat.* 2, xi. 176; *Griseb. Gentian.* 110, and in *DC. Prodr.* ix. 45; *Thwaites Enum.* 203 (excl. var. β); *Bot. Mag.* t. 4423. Chironia trinervis, *Linn. Sp. Pl.* 272; *Moon. Cat.* 16. Lisianthus zeylanicus, *Spreng. Syst.* i. 586. —*Burm. Thes. Zeyl.* t. 67.

CEYLON; common up to 5000 ft., *Thwaites*, &c.

Stem 1–3 ft., quadrangular, erect, little-branched below. *Leaves* 4 by 1 in., narrowed at the base, subsessile. *Corymbs* terminal, many-fld., 1-fld. peduncles from the lower axils sometimes added. *Calyx-lobes* $\frac{2}{3}$ in.; wing lanceolate, in fruit ovate or cordate. *Corolla-lobes* blue, obovate-oblong, obtuse or subacute. *Capsule* $\frac{1}{2}$ by $\frac{1}{3}$ in.

VAR. *macrantha*; stem terete, corolla purplish-blue, anthers $\frac{1}{8}$ in. broad. E. macrantha, *Arn. in Ann. Nat. Sc.* 2, xi. 176; *Griseb. Gentian.* 111, and in *DC. Prodr.* ix. 46; *Bot. Mag.* t. 4771; *Thwaites Enum.* 203.—Ceylon, frequent. The lobes of the corolla are not always acuter than in many examples of *E. zeylanicum* type.

*** Smaller slenderer plants with small 4-merous flowers.

11. **E. pedunculatum,** *Linn.*; *Griseb. Gentian.* 112, and in *DC. Prodr.* ix. 46; stem erect much-branched, leaves subsessile elliptic or lanceolate 3-nerved, cymes terminal many-fld., pedicels suberect rigid, corolla blue. *Vahl*

Symb. iii. 15; *Wall. Cat.* 4359; *Thwaites Enum.* 203; *Clarke in Journ. Linn. Soc.* xiv. 427. E. pedunculare, *Arn. in Ann. Sc. Nat.* 2, xi. 176; *Wight Ic.* t. 336. E. sulcatum, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 415; *Griseb. in DC. Prodr.* ix. 46, *syn. excl.* E. rivulare, *Edgew. Catal. Pl. Banda*, 51.

Throughout INDIA, ascending to 3000 ft., from Oudh and Bengal to CEYLON, *Thwaites* (C.P. 1876 in Herb. Kew), &c.

Stem 3–12 in., quadrangular. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in. *Peduncles* $\frac{1}{8}$–$\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in., ovate, acuminate; wing distinct, lanceolate. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., elliptic. *Anthers* $\frac{1}{8}$ in., scarcely attenuate upwards, dehiscing finally halfway to the base. *Capsule* $\frac{1}{8}$ in., subglobose.—Linnæus' species is founded on *Pluk. Alm. Mant.* t. 343, fig. 3, and Grisebach throws doubt on the identification by saying that Plukenet's figure is bad; but it seems unusually good and characteristic.

12. **E. pumilum,** *Griseb. in DC. Prodr.* ix. 46; stem erect branched upwards, leaves sessile lanceolate 3-nerved, cymes lax, pedicels slender, corolla purple-blue. *Wight Ic.* t. 1324; *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 427.

The CONCAN; Belgaum, *Graham, Dalzell*, &c.

Closely allied to *E. pedunculatum*, but slenderer. *Leaves* usually narrower; lower often 1-nerved. *Flowers* less numerous; pedicels (many of them) $\frac{1}{2}$–1 in. *Calyx-wings* narrower, lanceolate, sometimes obsolete. *Anthers* dehiscing finally often to the base.

13. **E. sessile,** *Linn.*; *Griseb. Gentian.* 113, and in *DC. Prodr.* ix. 47; leaves small sessile ovate, pedicels lateral and terminal very short cernuous, calyx-lobes ovate acute not winged, corolla white. *Vahl Symb.* iii. 16; *Wight Ic.* t. 1324. E. macrantherum, *Miq. Pl. Hohenack.* n. 582.

DECCAN PENINSULA; Mangalore, *Hohenacker*. CEYLON; common up to 2000 ft., *Macrae*, &c.

Stem 4–8 in., erect, quadrangular, simple or corymbose upwards. *Leaves* $\frac{1}{3}$ by $\frac{1}{4}$ in., obscurely nerved, acute or subobtuse. *Peduncles* 0–$\frac{1}{8}$ in., axillary, 1-flowered; terminal peduncle appearing sometimes 1 in., but then bearing a pair of small leaves near the flower. *Calyx-lobes* $\frac{1}{10}$ in., herbaceous. *Corolla-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in., elliptic. *Anthers* $\frac{1}{16}$ in. *Capsule* $\frac{1}{8}$ in., subglobose.—The examples marked *E. macrantherum*, Miq., are certainly *E. sessile*, Linn., but are mixed with *E. pumilum*, and the locality Mangalore is therefore not certain.

14. **E. Lawii,** *Clarke*; leaves small sessile ovate, cyme few-fld. lax, pedicels mostly elongate, calyx-lobes ovate strongly nerved not winged, corolla purple-blue. E. sessile, *Clarke in Journ. Linn. Soc.* xiv. 427, *as to the Bombay examples.*

The CONCAN and MALABAR; Bababoodan hills, *Law*; Belgaum hills, *Ritchie*.

Stem 3–6 in., erect, slender, quadrangular, simple or slightly branched upwards. *Leaves* $\frac{1}{4}$ in. long and broad. *Peduncles* terminal or subterminal, many of them $\frac{1}{2}$–2 in. without leaves or bracts. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in., patent, much-nerved at flower-time. *Corolla-lobes* $\frac{1}{5}$–$\frac{1}{3}$ in., elliptic or round. *Anthers* $\frac{1}{10}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., ovoid.—Named *E. sessile* by all collectors, but the flowers are larger, and the inflorescence altogether different.

15. **E. petiolare,** *Griseb. in DC. Prodr.* ix. 46; leaves petioled elliptic or ovate mostly 5-nerved, peduncles erect, calyx-wings broad, corolla white or pale blue. *Wight Ic.* t. 1324; *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 427. E. carinatum, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 415? Sebæa carinata, *Spreng. Syst.* i. 426?

The CONCAN, *Stocks*, &c. CHOTA NAGPORE, alt. 1–3000 ft., abundant, *Clarke*.

Stem 2–12 in., erect, quadrangular, branched upwards. *Leaves* 3 by $1\frac{1}{4}$ in.,

5-nerved, in small specimens lanceolate and subsessile; petiole $\frac{1}{2}$ in. *Cymes* terminal, erect; pedicels mostly $\frac{1}{4}$–$\frac{3}{4}$ in.; the 1-flowered peduncle at the bifurcation of the cyme often 1–2$\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{3}$ in.; wing in fruit ovate or cordate, nerved. *Corolla-lobes* $\frac{1}{4}$ in. or more (or in small examples $\frac{1}{8}$ in.). *Anthers* $\frac{1}{8}$ in., finally dehiscing nearly to the base. *Capsule* $\frac{1}{5}$ in., subglobose.—Roxburgh's Ic. Ined. of his *E. carinatum* resembles in all respects *E. pedunculatum*, Linn., except that the corolla-lobes are orange-yellow. As a yellow corolla is unknown in *Exacum*, Sprengel placed the species under *Sebæa*. Arnott and Grisebach, assuming that Roxburgh had not seen the plant alive, reduce it to *E. pedunculatum*. But as Roxburgh had the plant in cultivation and both figured and described *E. pedunculatum* (under *E. sulcatum*), it is not likely that his *E. carinatum* is the same thing. Roxburgh's description seems almost certainly to refer to *E. petiolare*, Griseb., which has white corolla-lobes with yellow anthers and the marked calyx-wing, &c., described by Roxburgh. It doubtless extends to Ceylon, for Thwaites' *E. petiolare* (Clarke in Journ. Linn. Soc. xiv. 427) were almost surely rightly named, though the number (C.P. 1876) attached to the specimens is wrong.

**** Small plant with small 5-merous flowers.

16. **E. pteranthum,** *Wall. Cat.* 4360; leaves elliptic acuminate 3-nerved often petioled, calyx-lobes winged. *Griseb. in DC. Prodr.* ix. 47.

PEGU and TENASSERIM, *Wallich, Lobb*, alt. 3–4000 ft., *Kurz*.

Stem 4–8 in., erect, quadrangular, simple or slightly branched upwards. *Leaves* 1$\frac{3}{4}$ by $\frac{2}{3}$ in., base narrowed; petiole sometimes $\frac{1}{5}$ in. *Cymes* terminal, few-fld., axillary 1-fld. peduncles sometimes added; pedicels 0–$\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{5}$ in., ovate, acute; wings broad-lanceolate or ovate. *Corolla-lobes* $\frac{1}{4}$ in., ovate-lanceolate. *Anthers* $\frac{1}{12}$ in., dehiscent finally nearly to the base. *Capsule* $\frac{1}{6}$ in., subglobose.

DOUBTFUL SPECIES.

E. PUNCTATUM, *Linn. f. Suppl.* 124; leaves very shortly petioled 3-nerved glandulose-punctate, corolla blue, stamens exserted yellow. *Griseb. in DC. Prodr.* ix. 47. —INDIA, *Koenig*.

3. SEBÆA, *R. Br.*

Erect, annual herbs. *Leaves* small, sessile. *Flowers* small, yellow, in terminal cymes. *Calyx-lobes* 4–5, keeled. *Corolla-tube* cylindric; lobes 4–5 patent. *Stamens* 4–5, on the upper part of the corolla-tube, filaments short linear; anther-cells oblong, opening introrsely by longitudinal slits. *Ovary* completely 2-celled, placentæ large; style short, linear, stigma globose or subspathulate. *Capsule* globose or ellipsoid, septicidally 2-valved. *Seeds* very many, minute, polyhedral, testa coarsely loosely reticulated.—Species 18; in Africa, Madagascar, Australia, and N. Zealand.

S. khasiana, *Clarke in Journ. Linn. Soc.* xiv. 428; cauline leaves $\frac{1}{8}$–$\frac{1}{6}$ in. lanceolate-linear, cyme 1–7-flowered, calyx 5-partite. Cicendia microphylla, *Edgew. in Trans. Linn. Soc.* xx. 83. Erythræa microphylla, *Benth. in Gen. Pl.* ii. 811.

N. W. HIMALAYA; Gurwhal, alt. 5–6000 feet, *Edgeworth*; NEPAL; *Wallich.* KHASIA MTS., Kollong Rock, alt. 5500 ft., *Clarke.*—DISTRIB. Angola.

Stem 6 in., simple, slender, angular, glabrous. Radical *leaves* 0 at flowering time. *Pedicels* $\frac{1}{12}$–$\frac{1}{3}$ in., rigid, angular. *Sepals* $\frac{1}{5}$ in., lanceolate, keeled, scarious-margined. *Corolla-tube* $\frac{1}{4}$ in.; lobes $\frac{1}{4}$ in.; elliptic. *Anthers* oblong, scarcely apiculate, without glands at the base, finally straight; stigma a flattened ellipsoid, papillose on the edge. —*S. aurea*, R. Br. (*Griseb. in DC. Prodr.* ix. 52), has the upper leaves broader, but the plant collected by Welwitsch in Angola is identical with the Indian, except that its anthers are minutely apiculate.

4. **HOPPEA**, *Willd.*

Small, much branched, glabrous herbs. *Leaves* small, sessile, ovate or elliptic. *Cymes* 2–3-chotomous, flowers sessile or short-pedicelled. *Calyx* campanulate; lobes 4, ovate, acuminate. *Corolla-tube* subglobose or elongate; lobes 4, short or long, more or less unequal. *Stamens* 1 perfect, 3 barren, attached in the corolla-throat, filaments linear short; anthers ovate, dehiscing introrsely by two longitudinal slits; barren anthers similar but much smaller, sometimes 0. *Ovary* 1-celled, placentæ not far intruded; style short, stigma subentire. *Capsule* globose or ellipsoid, carpels separating. *Seeds* very many, minute, nearly black, obscurely reticulated.—Species 2, Indian.

1. **H. dichotoma**, *Willd. in Ges. Nat. Fr. Berl. Neue Schrift.* iii. 435; divaricately densely branched often from near the base, corolla ventricose shorter than the calyx both in flower and fruit, lobes short triangular, capsule subglobose. *Hayne Termin. Bot.* t. 30, *fig.* 3. Hoppea dichotoma, *Vahl Enum.* i. 3. Pladera pusilla, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 419; *Griseb. in DC. Prodr.* ix. 63; *Clarke in Journ. Linn. Soc.* xiv. 429. Canscora pusilla, *Roem. & Sch. Syst.* iii.; *Mant.* 230 (*excl. syn.* Exacum sessile); *Wall. Cat.* 4366; *D. Don in Trans. Linn. Soc.* xvii. 530. Cicendia Roxburghii, *Griseb. Gentian.* 160; *Thoms. & Bacon in Hook. Lond. Journ.* iv. 637, t. 22.

Throughout INDIA, alt. 0–3000 ft.; very common; from the Punjab and Assam to Belgaum and Central India, the Circars, and Chittagong.

Stem 1–5 in., quadrangular. *Leaves* $\frac{1}{4}$ in., ovate. *Cymes* dense or lax. *Calyx* $\frac{1}{12}$ in.; lobes scarious, marginal nerve green. *Corolla* white, tube $\frac{1}{20}$ in., ventricose; in fruit wider upwards with the lobes incurved, overtopped by the acute calyx-teeth. *Stigma* clavate, obscurely 2-fid.

2. **H. fastigiata**, *Clarke*; corymbose upwards with ascending branches, corolla tubular lobes oblong overtopping the calyx both in flower and fruit, capsule ellipsoid. Cicendia fastigiata, *Griseb. Gentian.* 158, and in *DC. Prodr.* ix. 62. Pladera fastigiata, *Arnott in Herb. Wight*; *Clarke in Journ. Linn. Soc.* xiv. 429. P. pusilla, *Thwaites Enum.* 204, *not of Roxb.* Exacum? concinnum, *Miq. in Pl. Hohenack.* n. 581.

S. DECCAN PENINSULA, Mysore and Courtallum, *Wight*; Mangalore, *Hohenacker*. MOULMEIN; *Lobb*. CEYLON, frequent.

Stem 2–6 in., winged. *Leaves* $\frac{1}{3}$ in., ovate. *Flowers* fastigiate. *Calyx* $\frac{1}{8}$ in.; lobes scarious with a marginal nerve. *Corolla-tube* $\frac{1}{10}$ in. long, oblong, in fruit narrowed in the throat with the lobes erect, much overtopping the calyx-teeth. *Stigma* slightly clavate, subentire. *Seeds* very small, but twice as large as those of *H. dichotoma*.—The type of *Cicendia fastigiata*, Griseb. is Macrae's Ceylon plant, which Grisebach (*Gentian.* 159) says has 4 perfect stamens, but it has 1 only. The corolla in the present species is totally unlike that of *Hoppea dichotoma*, and the species so far agrees with *Cicendia*.

5. **ENICOSTEMA**, *Blume.*

A glabrous herb, erect, or decumbent branched. *Leaves* sessile, ovate-lanceolate or linear. *Flowers* small, in sessile axillary clusters. *Calyx* deeply 5-fid; segments not keeled. *Corolla* tubular funnel-shaped; lobes 5, spreading, white or bluish. *Stamens* 5, on the upper part of the corolla-tube, filaments shortly linear with minute scales at their base; anthers oblong, acute, included. *Ovary* 1-celled, placentæ not far intruded; style short, linear, stigma capitate. *Capsule* ellipsoid, carpels separating. *Seeds* many, subglobose, reticulated.

E. littorale, *Blume Bijd.* 848; *Griseb. Gentian.* 135 and in *DC. Prodr.* ix. 66. Gentiana verticillata, *Linn.*; *Wall. Cat.* 4396; *Roxb. Fl. Ind.* ii. 71. G. verticillaris, *Retz Obs.* ii. 15. Exacum hyssopifolium, *Willd. Sp. Pl.* i. 640; *Roxb. Hort. Beng.* 10. E. verticillatum, *Willd. Sp. Pl.* i. 640. Ericoila verticillata, *Borkh. in Roem. Arch.* i. 27. Hippion hyssopifolium and verticillatum, *Spreng. Syst.* i. 589; *Griseb. Gentian*, 134. H. orientale, *Dalz. & Gibs. Bomb. Fl.* 157. Cicendia hyssopifolia, *W. & A. in Hook. Comp. Bot. Mag.* ii. 249, t. 28. Slevogtia verticillata, *D. Don in Trans. Linn. Soc.* xvii. 532. S. orientalis and occidentalis, *Griseb. in DC. Prodr.* ix. 65. S. maritima, *Dalz. in Hook. Kew Journ.* ii. 137. Adenema hyssopifolium, *G. Don Syst.* iv. 201; *Wight Ic.* t. 600.

Throughout INDIA, alt. 0–1500 ft.; from the Punjab and Gangetic Plain to CEYLON; more frequent near the sea, not known in Bengal.—DISTRIB. Malaya, Tropical Africa, W. Indies.

Stem 4–20 in., terete or quadrangular, internodes short. *Leaves* 2 by $\frac{1}{3}$ in., or small or sublinear. *Calyx* $\frac{1}{10}$ in.; lobes narrowly oblong, obtuse. *Corolla-tube* $\frac{1}{8}$ in.; lobes $\frac{1}{10}$ in., elliptic. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in. *Seeds* small, but much larger than in the preceding genera.

6. ERYTHRÆA, *L. C. Rich.*

Herbs, annual or perennial, erect, branched. *Leaves* opposite, sessile. *Cymes* dichotomous, dense or corymbose, rarely elongate; flowers rose, white or (in non-Indian species) yellow. *Calyx* tubular; teeth 5, lanceolate or linear, keeled. *Corolla-tube* long or short; lobes 5, spreading. *Stamens* 5, near the summit of the corolla-tube, filaments short linear; anthers narrowly oblong. *Ovary* 1-celled, placentæ far intruded; style linear, stigmas semicircular or oblong. *Capsule* oblong, about as long as the calyx, nearly 2-celled, 2-valved, capsules separating. *Seeds* very small, reticulated.—Species 20, throughout the N. Hemisphere, extending to Chili and Australia.

The Indian species have all an elongate corolla-tube, as long or longer than the calyx, and the corolla-lobes elliptic or oblong, small, much shorter than the tube, and would be by some authors all referred as varieties to *E. ramosissima*, Pers.

1. **E. ramosissima,** *Pers. Syn.* i. 283; radical leaves not rosulate cauline oblong or elliptic acute, flowers rose-coloured clustered sessile prominently bracteate, calyx-teeth long linear about equalling the corolla-tube. *Griseb. Gentian.* 137, and in *DC. Prodr.* ix. 57; *Boiss. Fl. Orient.* iv. 67. E. pulchella, *Hornem. in Fl. Dan.* t. 1637. Erythræa sp. 2, *Clarke in Journ. Linn. Soc.* xiv. 428. Gentiana Centaurium, var. β, *Linn. Sp. Pl.* 333.

PUNJAB, alt. 1–2000 ft.; Loodiana, Hooshiapore, *Thomson*, *Edgeworth*, &c.—DISTRIB. Cabul and Beloochistan, W. Asia and Egypt.

Stem 3–15 in., very leafy. *Leaves* $1\frac{1}{2}$ by $\frac{2}{5}$ in. *Calyx* $\frac{1}{3}$ in.; teeth prominent, overtopping the buds almost till the moment of opening.—This Punjab plant is not exactly the type of *E. ramosissima*, being often tall, leafy, the flowers in clusters enveloped with bracts, the calyx-teeth substellate; the same form extends through Asia to Egypt.

VAR. *caspica*; upper leaves oblong-linear, cyme repeatedly dichotomous. E. caspica, *Griseb. Gentian.* 145, and in *DC. Prodr.* ix. 59.—Punjab (?), *Falconer.*—Cabul and the Caspian region.

VAR. *pulchella*, Griseb. Gentian. 137; stem slender, cauline leaves $\frac{1}{4}$–$\frac{1}{2}$ in. oblong or ovate obtuse, cymes depauperated, calyx-teeth not prominent.—Skardo, alt. 7–8000 ft., *Thomson.*—Distrib. Central and W. Asia. This is not exactly the same as Fries' *E. pulchella*, but it is included under *E. ramosissima* by Boissier, *l. c.* *Hk. f. & T.* in Herb. marked it *E. tenuiflora*, Link (*Fl. Port.* i. t. 67), which again is only a var. of *E. latifolia*, Griseb.; but the true *E. latifolia*, Smith, differs considerably, having larger flowers and being allied to *E. Centaurium.*

2. **E. Roxburghii,** *G. Don Gen. Syst.* iv. 206; radical leaves numerous persistent obovate or elliptic cauline smaller narrower, cymes repeatedly dichotomous with a long-pedicelled flower in each fork, corolla-tube much longer than the calyx, lobes rose-coloured. *Griseb. Gentian.* 145, and in *DC. Prodr.* ix. 59; *Dalz. & Gibs. Bomb. Fl.* 157. E. ramosissima, Var. *a* and *β*, *Clarke in Journ. Linn. Soc.* xiv. 428, *not of Pers.* Chironia centaurioides, *Roxb. Fl. Ind.* i. 584; *Wall. Cat.* 4397.

Throughout INDIA ascending to 2000 ft., from the Punjab and Bengal to Travancore; common in Bengal Plain.

Stem 2–8 in. *Radical leaves* 1 by $\frac{1}{3}$ in., usually obtuse. *Cyme* fastigiate or widely dichotomous; pedicels in the forks usually $\frac{1}{4}$–$\frac{1}{2}$ in.; bracts not prominent. *Calyx* $\frac{1}{5}$ in. *Corolla-tube* exceeding $\frac{1}{4}$ in., lobes very small.

VAR. *saxatilis*; stem taller panicled, leaves narrowly lanceolate basal leaves dis appearing, flowers in small terminal clusters.—S. Deccan Peninsula.

3. **E. Meyeri,** *Bunge*; *Ledeb. Fl. Alt.* i. 220, and *Ic.* t. 159; radical leaves not rosulate cauline oblong, cyme laxly sparingly dichotomous with a long-pedicelled flower in each fork, corolla-tube scarcely longer than the calyx lobes white. E. ramosissima and altaica, *Griseb. in DC. Prodr.* ix. 57. E. ramosissima, var. albiflora, *Boiss. Fl. Orient.* iv. 67.

KASHMIR and BALTISTHAN; alt. 5–8000 ft., frequent.—DISTRIB. Cabul, Central Asia to the Altai.

Stem 4–10 in., undivided below; radical leaves 2 or 0 at flowering time. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., subobtuse. *Pedicels* of the flowers on the forks $\frac{1}{4}$–$\frac{3}{4}$ in.—It is not clear why Grisebach and Boissier, while maintaining several Erythræas as distinct species, reduce this to *E. ramosissima*, from which it is remote in its undivided stem and long-pedicelled flowers, which are invariably *white*. It is in fact much nearer *E. Roxburghii.*

4. **E. babylonica,** *Griseb. in DC. Prodr.* ix. 60; stem quadrangular, radical leaves not rosulate, cauline oblong remote, cyme laxly dichotomous, branches erect all the flowers subsessile rose-coloured. E. spicata, var. *Boiss. Fl. Orient.* iv. 69; *Clarke in Journ. Linn. Soc.* xiv. 428. E. ramosissima and linarifolia, *Clarke l. c., not of Persoon.*

PUNJAB; *Falconer*; Lahore, *Brandis.*—DISTRIB. Cabul, Persia.

Stem 6–15 in., simple below, acutely quadrangular. *Radical leaves* 2–0 at flowering time. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., scarcely acute. *Cyme* symmetrically dichotomous; pedicels of the flowers in the forks scarcely $\frac{1}{8}$ in. *Calyx* $\frac{1}{3}$ in., nearly equalling the corolla-tube.—Considered by Bentham and Boissier a var. of *E. spicata*, Pers., which differs only by its unilateral cyme-branches. *E. babylonica* has been misunderstood, because Grisebach described the flowers as 4-merous, whereas in Aucher-Eloy's n. 2432 (Grisebach's type) they are 5-merous. The Cabul examples identical with this are called by Boissier *E. caspica*, and it is very difficult to say how they differ except in the strict cymes forming an elongate panicle.

7. CANSCORA, *Lamk.*

Annual herbs, dichotomously branched. *Leaves* opposite, sessile, petioled or perfoliate. *Flowers* in terminal or central cymes, or axillary solitary, or densely spiked on scapes. *Calyx* tubular, 4-toothed, terete striate keeled or winged. *Corolla-tube* cylindric, about as long as the calyx; lobes 4, more or less unsymmetric, imbricate in the bud. *Stamens* 4, near the summit of the corolla-tube; 1 or 2 larger with longer filaments and fertile ovate or oblong anthers; 3 or 2 with shorter (often lower-attached) filaments, smaller, barren or sometimes subobsolete. *Ovary* 1-celled, placentæ not far intruded; style

linear, stigmas 2 short hemispheric. *Capsule* 2-valved, separating into its 2 carpels, or often very thin breaking up irregularly. *Seeds* very small, polyhedral, dark brown, reticulated.—Species 14, chiefly Indian; Malaya, Australia, Trop. Africa and its islands.

SUBGENUS I. **Eucanscora.** *Flowers* in terminal dichotomous cymes, or pedicelled in axillary small cymes. *Calyx* keeled or winged. *Corolla* subbilabiate. *Stamens* 4, one larger perfect, three shorter smaller barren or subobsolete.

* Cymes terminal; bracts at its bifurcations not perfoliate.

† *Calyx striate or keeled, not winged, pedicels not 4-winged.*

1. **C. diffusa,** *Br. Prodr.* 451 *in Obs.*; stem quadrangular, lower leaves lanceolate or elliptic, cyme diffuse, bracts (at least of its lower divisions) large ovate acute sessile membranous, pedicels slender flexuose, corolla rose. *Griseb. Gentian.* 152, and *in DC. Prodr.* ix. 64; *Wall. Cat.* 4361; *Dalz. & Gibs. Bomb. Fl.* 158; *Clarke in Journ. Linn. Soc.* xiv. 429; *Benth. Fl. Austral.* iv. 372. C. foliosa, *G. Don Gen. Syst.* iv. 190? C. Lauri, *Wight Ic.* t. 1327, *not of Clarke.* Gentiana diffusa, *Vahl Symb.* iii. 47. Exacum diffusum, *Willd. Sp. Pl.* i. 637. E. erectum, *Roth Nov. Sp.* 83. Orthostemon erectum, *Br. Prodr.* 451; *Griseb. Gentian.* 151, and in *DC. Prodr.* ix. 63. O. Hugelii, *Griseb. in DC. Prodr.* ix. 63. Pladera virgata, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 417; *Hook. Bot. Misc.* iii. 88, t. 25. Cobamba dichotoma, *Blanco Fl. Filip.* (ed. 2) 355.

Throughout INDIA ascending to 4000 ft., common; from Kumaon and Bhotan to CEYLON and Tenasserim.—DISTRIB. Malaya, Australia, and E. Tropical Africa.

Annual, erect, 4–20 in., densely branched upwards. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., 3-nerved, often petioled; upper passing into the bracts. *Cyme* diffuse, leafy; bracts $\frac{1}{2}$ in. leaflike, a few of the uppermost linear. *Calyx* $\frac{1}{5}$ in.; teeth lanceolate-linear. *Corolla-tube* $\frac{1}{3}$ in., lobes $\frac{1}{6}$ in. *Stamens* one on the corolla-throat, perfect; 3 rather lower down with slightly shorter filaments and smaller anthers, polliniferous or not. *Capsule* oblong, as long as the calyx.

VAR. *tenella*; bracts ovate herbaceous, many of the upper linear. C. tenella, *Wight Ic.* t. 1327; *Wall. Cat.* 4362.—Malabar and Mysore, *Wight.*—This has the bracts nearly as in the next species, but the cyme is diffuse, the pedicels long slender.

2. **C. decurrens,** *Dalz. in Hook. Kew Journ.* ii. 136; stem 4-winged, lower leaves lanceolate or elliptic, cyme erect with ascending branches, bracts in its upper part small or linear, pedicels erect, corolla rose or white. *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 430. C. divaricata, *Miq. in Pl. Hohenack.* n. 670.

W. DECCAN PENINSULA from the Concan southwards, frequent.

Very doubtfully distinct from *C. diffusa*, var. *tenella*. *Leaves* hardly decurrent. *Cyme* subtrichotomous (in *C. diffusa* usually dichotomous).

3. **C. pauciflora**, *Dalz. in Hook. Kew Journ.* ii. 136; stem 4-winged, lower leaves ovate or obovate, cyme laxly dichotomous few-flowered, branches long curved ascending somewhat 4-angled, pedicels often thickened under the calyx. *Dalz. & Gibs. Bomb. Fl.* 157. C. lancifolia, *Miq. in Pl. Hohenack.* n. 305. C. Lauri, *Clarke in Journ. Linn. Soc.* xiv. 430, *not of Wight.*

W. DECCAN PENINSULA, from Malwan to Quilon; *Dalzell, Wight, &c.*

Lower *leaves* scarcely $\frac{1}{2}$ in., smaller than the middle cauline. *Bracts* (of the lower part of the cyme) rarely so much as $\frac{1}{4}$ in., oblong or linear.—This seems very near, but separable from, *C. diffusa*; Wight, however, in his Herb., referred it to his *C. tenella* (treated above as a var. of *C. diffusa*).

†† *Calyx keeled not winged, cyme-branches distinctly winged.*

4. **C. sessiliflora**, *Roem. & Sch. Syst.* iii. *Mant.* 230; leaves ovate, flowers in the forks of the cyme sessile. *Wall. Cat.* 4367; *Griseb. Gentian.* 153, and in *DC. Prodr.* xiv. 64; *Clarke in Journ. Linn. Soc.* xiv. 430. Gentiana heteroclita, *Linn. Mant.* 560. Exacum heteroclitum, *Willd. Sp. Pl.* i. 639. Pladera sessiliflora, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 416. Centaurium malabaricum, *Borkh. in Roem. Arch.* i. 27.

S. DECCAN PENINSULA; *Rottler, Wight*, &c. CEYLON, Batticaloa district, not common, *Thwaites*.

Stem 4–9 in., broadly 4-winged upwards. *Leaves* $\frac{1}{2}$ in., sessile, obtuse or subacute. *Cyme* with ascending branches; bracts $\frac{1}{8}$–$\frac{1}{4}$ in., narrow; lateral flowers usually bracteate, sometimes pedicelled. *Calyx* $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{4}$; lobes $\frac{1}{4}$ in., broadly obovate, rose-coloured. *Flowers* and *capsules* nearly as of *C. diffusa*, but slightly larger.

††† *Calyx distinctly winged.*

5. **C. decussata**, *Roem. & Sch.* iii. *Mant.* 229; leaves oblong-lanceolate, cyme rigidly erect branches 4-winged, calyx-wings narrowly lanceolate, flowers white. *Wall. Cat.* 4364; *Griseb. Gentian.* 153, and in *DC. Prodr.* ix. 430. Pladera decussata, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 418; *Bot. Mag.* t. 3066.

Throughout INDIA, ascending to 4000 ft.; from the Himalaya to Burma; abundant in Bengal Plain. CEYLON, not uncommon.—DISTRIB. Madagascar, Bourbon, Trop. Africa.

Stem 4–20 in., 4-winged. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in., sessile, 3-nerved. *Cyme* lax; flowers in the forks pedicelled. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in. *Corolla-tube* as long as the calyx; lobes $\frac{1}{4}$ in., obovate, obtuse. *Stamens* 1 perfect; 3 barren, variously reduced, subsessile or with filaments. *Capsule* and *seeds* considerably larger than in *C. diffusa*.—*Exacum alatum*, Roth, is reduced here by Grisebach, and there are specimens of Rottler and Heyne which do belong; but Roth's description "calyx with broad scarious wings, corolla rose" refers entirely to *Canscora perfoliata*, Lamk.

6. **C. concanensis**, *Clarke*; leaves ovate, cymes slender branches not winged, calyx-wings elliptic nerved scarious in fruit.

The CONCAN, *Law*.

A slender annual, 3–5 in.; stem decumbent then erect, obscurely quadrangular. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., subacute, sessile, 3-nerved. *Cymes* weak, at first dichotomous, branches upwards subunilateral, flowers all pedicelled; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in., slender; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., linear. *Calyx* $\frac{1}{3}$ in.; wings $\frac{1}{8}$ in., broad in fruit. *Corolla-tube* as long as the calyx; lobes $\frac{1}{6}$ in., obovate, obtuse, seem to have been rose.—Nearest to *C. macrocalyx*, Miq. Fl. Ind. Bat. ii. 558, which is a rigid erect plant with winged stem and cyme-branches.

** Cymes terminal; bracts at its bifurcations (or some of them) perfoliate.

7. **C. perfoliata,** *Lamk. Dict.* i. 601, *not of Griseb.*; leaves elliptic acute, calyx large wings elliptic nervose. C. alata, *Wall. Cat.* 4363 A; *Griseb. Gentian.* 154, and in *DC. Prodr.* ix. 65; *Dalz. & Gibs. Bomb. Fl.* 158; *Clarke in Journ. Linn. Soc.* xiv. 431. C. grandiflora, *Wight Ic.* t. 1326. C. macrocalyx, *Miq. in Pl. Hohenacker*, n. 810 (*not Fl. Ind. Bat.* ii. 558). Pladera perfoliata, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 418. Exacum alatum, *Roth Nov. Sp.* 85.—*Rheede Hort. Mal.* x. 103, t. 52.

The DECCAN PENINSULA; from Bombay to Travancore; *Rottler*, &c.

Stem 6–18 in., 4-winged. *Leaves* 1 by $\frac{1}{2}$–$\frac{2}{3}$ in., sessile, 3-nerved. Upper *bracts* $\frac{1}{2}$ in. diam., suborbicular, 2-mucronate; pedicels very short. *Calyx* $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{4}$–$\frac{1}{3}$ in.

Corolla-tube as long as the calyx; lobes $\frac{1}{4}$–$\frac{1}{3}$ in., obovate, obtuse, rose. *Capsule* $\frac{1}{3}$ in. —Lamarck founded *Canscora* and the species *C. perfoliata* on Rheede l. c.; Grisebach says the calyx is exalate, in direct opposition to Rheede's figure and description; moreover the size of the calyx and corolla and whole habit of the plant in Rheede shows that his figure means the *Pladera perfoliata* of the old collectors.

8. **C. Wallichii,** *Clarke*; leaves oblong acute, calyx cylindric not winged. C. perfoliata, *Wall. Cat.* 4365; *Griseb. Gentian.* 155, and in *DC. Prodr.* ix. 65 (*syn. excl.*); *Wight Ic.* t. 1327, *middle figure*; *Thwaites Enum.* 204; *Clarke in Journ. Linn. Soc.* xiv. 431, *not of Lamk.*—Canscora sp., *Wall. Cat.* 4363 B *partim.*

The CARNATIC, MYSORE, and MALABAR, *Heyne*, &c. CEYLON; north end of the Isld., *Gardner*, &c.

Stem 8–16 in., 4-winged. *Leaves* and *cyme* very nearly as of *C. perfoliata*; pedicels $\frac{1}{8}$–$\frac{3}{4}$ in., filiform. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$ in., in fruit scarious with 12 green nerves. *Corolla-tube* as long as the calyx; lobes hardly $\frac{1}{8}$ in., obovate, obtuse, rose.

*** Cymes axillary, weak, few-fld.

9. **C. andrographioides,** *Griff. mss.*; *Clarke in Journ. Linn. Soc.* xiv. 431; leaves elliptic-lanceolate 3-nerved, pedicels filiform, bracts minute, calyx cylindric striate not winged. Canscora diffusa?, *Wall. Cat.* 4361 K. Pladera? virgata, *Griff. Notul.* iv. 92.

KHASIA MTS.; alt. 1–4000 ft., frequent, *Wallich*, &c. MOULMEIN; *Griffith, Lobb.*

Stem paniculately branched from the base; branches 8–20 in., quadrangular, not winged. *Leaves* $1\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., 3–5-nerved; petiole $\frac{1}{12}$ in. *Cymes* 1–2 in., 1–5-flowered. *Calyx* $\frac{1}{3}$ by $\frac{1}{10}$ in. *Corolla-tube* as long as the calyx; lobes $\frac{1}{4}$ in., obovate-oblong, white- purple- or rose-veined. *Stamens*, 1 with a filament and ovate perfect anther, 3 subsessile with oblong small but often polliniferous anthers. *Capsule* and *seeds* nearly of *C. diffusa.*

SUBGENUS II. **Heterocanscora.** *Flowers* in dense spikes, opposite, each bracteate and with 2 large bracteoles. *Calyx* very thin, not winged. *Corolla, stamens,* and *style* of *Eucanscora.*

10. **C. Schultesii,** *Wall. Cat.* 4368; scapose, radical leaves small elliptic petioled. *Griseb. Gentian.* 155, and in *DC. Prodr.* ix. 65. Heterocanscora Schultesii, *Clarke in Journ. Linn. Soc.* xiv. 431.

BURMA; Prome Hills, *Wallich*; Pegu Yomah, *Kurz.*

Scapes 3–10, several from one annual root, somewhat 4-winged upwards. *Radical leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in.; cauline few, bractlike, $\frac{1}{4}$ in., linear, acute. *Flower-spikes* 1–3 in., terminal, simple, scarcely interrupted. *Bracts* $\frac{1}{3}$ in., boat-shaped, widely elliptic, shortly caudate; bracteoles similar, rather smaller, unilateral. *Calyx* $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{3}$ in., lobes $\frac{1}{5}$ in. *Stamens* 1 with a filament, perfect; 3 much smaller, on very short filaments. *Capsule* $\frac{1}{4}$ in., and *seeds* of *Canscora.*—In general habit, inflorescence, and bracts simulating *Andrographis paniculata.*

SUBGENUS III. **Phyllocyclus.** *Stem* and *branches* terete. *Leaves* all perfoliate orbicular. *Flowers* axillary, solitary. *Calyx* ventricose-tubular. *Stamens* 2 larger, on longer filaments, 2 smaller.

11. **C. Parishii,** *Hook. f. in Bot. Mag.* t. 5429; calyx $\frac{1}{3}$–$\frac{1}{2}$ in., corolla-tube as long as the calyx, lobes $\frac{1}{3}$ in. ovate white with two yellow spots at the base. Phyllocyclus Parishii, *Kurz in Journ. As. Soc.* 1873, pt. ii. 236; *Clarke in Journ. Linn. Soc.* xiv. 432.

MOULMEIN, *Griffith, Parish, Lobb.*

Stem 8–24 in., divaricately dichotomous. *Leaves* $1\frac{1}{4}$ in. diam., radiately nerved;

uppermost herbaceous. *Pedicels* 0–$\frac{1}{8}$ in. *Calyx* $\frac{1}{8}$–$\frac{1}{4}$ in. broad at the base, slightly narrowed upwards, lobes short triangular. *Capsule* $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid. *Seeds* as of *Eucanscora*.

12. **C. Helferiana,** *Wall. mss.*; calyx $\frac{1}{4}$–$\frac{1}{3}$ in., corolla-lobes $\frac{1}{4}$ in. Phyllocyclus Helferi, *Kurz in Journ. As. Soc.* 1873, pt. ii. 236; *Clarke in Journ. Linn. Soc.* xiv. 432.

MOULMEIN, *Griffith*; Three-Pagoda Pass into Siam, *Helfer* (Kew Distrib. n. 5816).
Closely resembling *C. Parishii*, but the calyx, corolla, and capsule rather smaller, and the uppermost (floral) leaves very scarious. It is probably only a var. of *C. Parishii.*

8. CRAWFURDIA, *Wall.*

Twiners. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary, solitary or in small cymes, purple white or greenish-yellow. *Calyx* tubular, lobes 5 (or 4 in a non-Indian species). *Corolla* elongate tubular-campanulate, plicate or subterete; lobes 5, short. *Stamens* 5, on the middle of the corolla-tube, filaments flattened; anthers oblong. *Ovary* stalked, 1-celled; disc small, 5-toothed; style linear, stigmas 2 short linear. *Fruit* globose or oblong, compressed or terete, 2-valved, or indehiscent. *Seeds* many, discoid, broadly winged, or wedge-shaped subtriquetrous narrowly 3-winged.—Species 9–10; in India, Malaya, China, and Japan.

SUBGENUS I. **Dipterospermum.** *Flowers* (or many of them) long-pedicelled. *Calyx* not keeled. *Capsule* dry. *Seeds* compressed, discoid; wing marginal, broad, simple, scarious.

1. **C. speciosa,** *Wall. Cat.* 4371, and *Tent. Fl. Nep.* 64, t. 48; leaves elliptic acuminate minutely denticulate glabrous, calyx-limb truncate teeth 5 small lanceolate excurrent below the margin, corolla-limb subtruncate teeth distant small triangular acute. *D. Don in Trans. Linn. Soc.* xvii. 517; *Griseb. Gentian.* 305, and in *DC. Prodr.* ix. 120; *Clarke in Journ. Linn. Soc.* xiv. 442, *partly.*

CENTRAL and EASTERN HIMALAYA; Nepal and Sikkim, alt. 6–10,000 ft., frequent, *Wallich, J. D. H.*, &c.
Leaves 3 by 1 in., base cuneate or rounded. *Cymes* 1–3 in., 1–5-flowered; pedicels 0–7 in.; bracts $\frac{1}{8}$ in., lanceolate, one pair near the base or summit of the pedicel, often 0. *Calyx* $\frac{1}{2}$ by $\frac{1}{5}$ in., cylindric, base campanulate; teeth $\frac{1}{8}$–$\frac{1}{5}$ in. *Corolla* $1\frac{1}{2}$ by $\frac{3}{4}$ in., purple, plicate; teeth scarcely $\frac{1}{8}$ in. *Filaments* dilated in the middle, attached in the middle of the corolla, sometimes free at the base. *Stigma* more than $\frac{1}{8}$ in., linear. *Capsule* 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., subincluded in the corolla, stalk $\frac{1}{2}$–$\frac{2}{3}$ in.

2. **C. campanulacea,** *Wall. & Griff. mss.*; leaves elliptic acuminate entire glabrous coriaceous, calyx-lobes ovate-lanceolate terminating the tube, corolla-lobes approximate ovate-lanceolate. C. speciosa, *Clarke in Journ. Linn. Soc.* xiv. 442, *partly.*

KHASIA MTS., alt. 4–6000 ft., frequent, *Wallich, H. f. & T.*, &c.
Leaves as of *C. speciosa* but more coriaceous, the 3 main nerves broad beneath, others obscure. *Peduncles* 0–4 in., all 1-flowered; bracts $\frac{1}{4}$ in., present or absent, varying in position. *Calyx-tube* $\frac{1}{2}$ by $\frac{1}{6}$ in., cylindric; lobes $\frac{1}{3}$–$\frac{1}{5}$ in., not keeled. *Corolla* $1\frac{1}{2}$ by $\frac{3}{4}$ in., purple, very obscurely plicate; teeth $\frac{1}{3}$–$\frac{1}{2}$ in., hardly keeled. *Stamens* as of *C. speciosa*. *Stigmas* $\frac{1}{8}$ in., linear. *Capsule* $\frac{3}{4}$ by $\frac{1}{4}$ in., included in the corolla; stalk $\frac{2}{3}$ in.

3. **C. angustata,** *Clarke*; leaves elliptic acuminate entire glabrous coriaceous, calyx-tube elongate teeth small approximate lanceolate, corolla-tube elongate narrow lobes lanceolate.

UPPER ASSAM; Mishmee Mts., *Griffith* (Kew Distrib. n. 5838, 5839).

Calyx-tube $\frac{3}{4}$ by $\frac{1}{8}$ in., narrowed at the mouth; teeth $\frac{1}{10}$ in., terminal. *Corolla* 2 by $\frac{1}{3}$ in.; segments $\frac{1}{3}$–$\frac{2}{3}$ in., acuminate. *Capsule* not ripe, seems likely to be narrow. —This may be a variety of *C. campanulacea.*

4. **C. puberula,** *Clarke in Journ. Linn. Soc.* xiv. 442; leaves elliptic acuminate minutely denticulate glandulose-puberulous on the nerves beneath, calyx subtruncate teeth small linear distant, corolla-limb subtruncate teeth small triangular acute.

SIKKIM HIMALAYA; Yakla, alt. 9–10,000 ft., *Clarke.*

Petioles glandular-pubescent. *Cymes* 1–4 in., 1–5-fld., slender. *Calyx* $\frac{1}{3}$ by $\frac{1}{8}$ in.; teeth $\frac{1}{8}$ in., subterminal. *Corolla* $1\frac{1}{4}$ by $\frac{1}{3}$ in., purple, plicate; lobes $\frac{1}{8}$ in. *Style* long, early exsert. *Capsule* $\frac{3}{4}$ by $\frac{1}{3}$ in., half-exsert from the corolla, stalk $\frac{3}{4}$–1 in.—Perhaps an alpine var. of *C. speciosa* which grows fully as high up, but the flowers are much smaller.

SUBGENUS II. **Tripterospermum.** *Flowers* (in the Indian species) fascicled. *Calyx* keeled. *Capsule* 2-valved or succulent, subindehiscent. *Seeds* wedge-shaped, triquetrous, almost winged on the angles, one face much narrower than either of the others.

5. **C. fasciculata,** *Wall. Tent. Fl. Nep.* 63. t. 47; leaves elliptic acuminate, calyx-teeth distant linear not half so long as the tube, corolla large purple, capsule 2-valved dry oblong short-stalked included in the corolla. *D. Don in Trans. Linn. Soc.* xvii. 518; *Griseb. Gentian.* 306, and in *DC. Prodr.* ix. 120; *Bot. Mag.* t. 4838; *Clarke in Journ. Linn. Soc.* ix. 442. C. affinis, *Wall. Cat.* 4370, *partly.*

KHASIA MTS., alt. 3–6000 ft., frequent, *Wallich,* &c.—DISTRIB. S. China.

Leaves 3 by 1 in. *Flowers* 3–1; sometimes pedicelled, with 2 foliaceous bracts under the flower. *Calyx-tube* $\frac{1}{2}$ by $\frac{1}{4}$ in., 5-keeled to the base, scarious between the keels; teeth $\frac{1}{4}$, linear, subterminal. *Corolla* $1\frac{1}{2}$ by $\frac{2}{3}$ in., plicate; lobes $\frac{1}{8}$ in., ovate, acute. *Capsule* 1 by $\frac{1}{4}$ in., stalk scarcely $\frac{1}{4}$ in.—The typical form here described is well-marked; but the starved forms with small flowers hardly differ from the next species by the shorter calyx-teeth and purple flowers.

6. **C. affinis,** *Wall. Cat.* 4370, *partly*; leaves cordate-lanceolate acuminate, calyx-teeth linear as long as the tube, corolla small white or greenish yellow, capsule 2-valved dry oblong short-stalked included in the corolla. C. fasciculata, *Wall. Cat.* 4369 A.

SIKKIM HIMALAYA, alt. 5–6000 ft.; frequent. KHASIA MTS., *Wallich.*

Closely resembling *C. fasciculata*; leaves rounded at the base. *Calyx-tube* $\frac{1}{5}$ in.; teeth more than $\frac{1}{4}$ in., subterminal. *Corolla* less than 1 by $\frac{1}{4}$ in. (in Wallich's example). *Capsule* $\frac{1}{2}$ by $\frac{1}{5}$ in.; stalk $\frac{1}{8}$ in.—The capsule is certainly dry, 2-valved; nevertheless it is to be feared that the species is merely a form of the next. The Javan *C. Blumei* (Tripterospermum trinerve, *Blume*; *DC. Prodr.* ix. 121) differs apparently only in having solitary long-pedicelled flowers.

7. **C. japonica,** *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 36; leaves cordate-lanceolate, calyx-teeth linear as long as the tube, corolla greenish or yellowish, berry ellipsoid red succulent included or exsert from the corolla. Golowninia japonica, *Maxim. in Bull. Acad. St. Petersb.* iv. 251, t. 4.

SIKKIM HIMALAYA, alt. 7000 ft., *J. D. H., Clarke.*—DISTRIB. Japan, China, Formosa.

Leaves 3 by 1 in. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in.; teeth distant, excurrent below the margin, or subterminal. *Corolla* 1–$1\frac{1}{4}$ by $\frac{1}{4}$ in., subtubular, plicate; lobes $\frac{1}{8}$ in., ovate, acute. *Stamens, style, and disc,* very nearly as of *C. speciosa,* but rather smaller. *Berry* $\frac{2}{3}$ by

$\frac{1}{4}$ in., ellipsoid, or $\frac{1}{2}$ by $\frac{2}{3}$ in., subglobose; completely exserted from the corolla, or half included (on the same branches); stalk often 1–$1\frac{1}{4}$ in.

VAR. *luteo-viridis*; berry 1 by $\frac{2}{3}$–$\frac{1}{2}$ in., quite included or $\frac{1}{3}$ exsert oblong red, stalk $\frac{1}{4}$–$\frac{1}{3}$ in. C. luteo-viridis, *Clarke in Journ. Linn. Soc.* xiv. 443. C. fasciculata, *Griff. Itin. Notes*, p. 27, n. 420, and p. 127, n. 470. Gentiana volubilis, *Don Prodr.* 126.—Himalaya, alt. 5–8000 ft.; from Kumaon to Bhotan, common. Khasia Mts.; alt. 3–5000 ft., frequent.—This is the common *C. fasciculata* of the Himalaya of collectors; but the stalk of the berry is frequently more elongated, and the berry itself so short, that it appears inseparable from *C. japonica*; when much less succulent it runs into *C. affinis*. Wallich appears not to have distinguished it from *C. fasciculata*, as he gives the Himalaya for the habitat of *C. fasciculata*, which species is confined to Khasia.

VAR. *Championi*; leaves hardly acute long-petioled, corolla smaller narrower, berry $\frac{1}{4}$ in. diam. subglobose red exserted. C. fasciculata, *Thwaites Enum.* 204. Tripterospermum Championi, *Gardn. ms.*—Ceylon; *Gardner, Thwaites.*

9. **GENTIANA,** *Linn.*

Herbs, annual or perennial, or (*G. crassa*, Kurz) shrubby. *Leaves* opposite, bases often connate. *Flowers* axillary or terminal. *Calyx* tubular, terete or rarely keeled (spathaceous in *G. decumbens*); lobes 5–4. *Corolla* tubular, bell- or funnel-shaped; lobes 5–4, often with folds between the lobes. *Stamens* 5–4, attached in the middle or lower half of the tube, included, filaments linear somewhat flattened downwards; anthers oblong or ovate. *Ovary* 1-celled, placentæ but little intruded; style short or 0, except in *G. stylophora*, stigmas divergent. *Capsule* stalked or sessile, ellipsoid or oblong, compressed, separating into its 2 carpels, usually to the base. *Seeds* very many, small, globose or oblong, often trigonous, testa close or lax sometimes prominently reticulated.—Species 180, chiefly in the mountains of the Old World, with a few in the Andes, New Zealand, and Australia.

SECT. I. **Amarella.** *Corolla* not more than 1 in. at the time of expansion, without folds. *Capsule* included, sessile or shortly stalked. *Seeds* small, yellow-brown, numerous, subglobose; testa close, not reticulated.

* *Corolla not fimbriate in the throat.*

1. **G. Moorcroftiana,** *Wall. Cat.* 4390; leaves oblong or elliptic, corolla nearly 1 in. 4–5-merous tubular- funnel-shaped. *Griseb. Gentian.* 243, and in *DC. Prodr.* ix. 96, *syn. excl.*; *Clarke in Journ. Linn. Soc.* xiv. 433.

WESTERN HIMALAYA; Kashmir, Baltisthan and Lahoul, alt. 8–12,000 ft., *Moorcroft, Falconer*, &c.

Stem 8–16 in., erect, 4-lineolate, branches ascending. *Leaves* 1 by $\frac{1}{3}$ in., narrowed below. *Cymes* in subterminal racemes; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{10}$ in.; lobes $\frac{1}{3}$ in., linear. *Corolla* (at time of expansion) $\frac{1}{2}$–1 in., up to the moment of expansion often short, blue in fruit enlarged often $1\frac{1}{4}$ in., funnel-shaped not campanulate, mouth $\frac{1}{3}$ in. diam. *Capsule* $\frac{2}{3}$ in., lanceolate; stalk $\frac{1}{8}$ in.—Measurements here taken from Moorcroft's example, the calyx-teeth are often even longer, $\frac{1}{2}$ by $\frac{1}{18}$ in.

VAR. *Falconeri*; flowers often 4-merous, calyx-teeth shorter broader often unequal opposite larger $\frac{1}{4}$ by $\frac{1}{8}$ in. G. Falconeri, *Clarke in Journ. Linn. Soc.* xiv. 433.—Kashmir, *Falconer*. The seeds do not differ from those of *G. Moorcroftiana*.

VAR. *Maddeni*; leaves narrowly lanceolate acute, expanded corolla often less than $\frac{1}{2}$ in.—Kumaon, alt. 10–12,000 ft., *Madden, Davidson.* Tibet, alt. 15,000 ft. (Piti ?), *Strachey & Winterbottom.*

2. **G. aurea,** *Linn.*; *Boiss. Fl. Orient.* iv. 71; leaves oblong or elliptic, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. 5-merous, tubular. *Griseb. Gentian.* 254, and in *DC. Prodr.* ix.

100. G. involucrata, *Fries in Act. Hafn.* x. 434, t. 1, fig. 2. G. quinquefolia, *Fl. Dan.* t. 344. G. umbellata, *Bieb. Fl. Taur. Cauc.* iii. 188. G. azurea, *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 230, t. 10, fig. 3, *not of Griseb.* G. Stoliczkai, *Clarke in Journ. Linn. Soc.* xiv. 433.

WESTERN TIBET; Baltisthan, alt. 10–14,000 ft.; *Thomson*, &c.—DISTRIB. Central Asia, and the whole Subarctic Zone.

Stem 4–18 in., erect, 4-lineolate or 4-angular, branches ascending. *Leaves* 1 by $\frac{1}{3}$ in., narrowed below. *Peduncle* $\frac{1}{4}$–2 in., 1-flowered, in axillary and terminal fascicles. *Calyx-tube* $\frac{1}{24}$ in., lobes $\frac{1}{5}$ in., linear-spathulate, minutely serrulate in the Indian plant. *Corolla* bluish or yellowish, lobes ovate mucronate shorter than the tube; basal glands obsolete. *Capsule* $\frac{1}{2}$ in., oblong; stalk $\frac{1}{8}$ in.—The Indian plant differs from *G. aurea*, Linn. type, in the absence or obscurity of the glands at the base of the corolla-tube, agreeing thus with *G. umbellata*, Bieb. This character considered by Grisebach as of sectional value is probably hardly specific.

VAR. *holosteoides*; height $\frac{1}{2}$–3 in., umbellate character of the inflorescence obscured. G. holosteoides, *Schott & Kotschy in Pl. Kotschy*, n. 285.—N. Kashmir, *Falconer*. Skardo; alt. 9100 ft., *Clarke*. Distrib. Taurus. The Skardo plant exactly agrees with Kotschy's.

3. **G. Thomsoni,** *Clarke*; minute, leaves obovate-oblong, corolla $\frac{1}{6}$–$\frac{1}{5}$ in. 4-merous funnel-shaped. Gentiana sp. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Karakorum, Nubra alt. 17,000 ft., *Thomson*.

Stem 1 in.; branches numerous, ascending. *Leaves* $\frac{1}{8}$–$\frac{1}{5}$ in. *Peduncles* $\frac{1}{4}$–1 in., erect, 1-flowered, subsolitary. *Calyx-tube* $\frac{1}{16}$ in.; lobes $\frac{1}{16}$ in.; oblong or rhomboid. *Corolla-lobes* oblong, about as long as the tube.

** *Corolla fimbriate in the throat.*

4. **G. borealis,** *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 251, t. 10, fig. 2; erect, leaves oblong, pedicels short, corolla tubular 4-lobed terminal flower often 5-lobed.

WESTERN TIBET, alt. 12–14,000 ft.; *Gen. Munro*; LAHOUL, Jaeschke; N. KASHMIR to the Karakorum, common.—DISTRIB. N.W. America.

Stem 3–12 in., 4-lineolate, branches ascending. *Leaves* 1 by $\frac{1}{3}$ in., base hardly narrowed. *Pedicels* 0–1 in., mostly cymose on axillary peduncles. *Calyx-tube* $\frac{1}{20}$ in., lobes $\frac{1}{4}$ by $\frac{1}{16}$ in. *Corolla* pink-purple; tube $\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in., ovate, mucronate. *Capsule* $\frac{1}{3}$ in., narrowly oblong; stalk $\frac{1}{12}$ in.—This has the habit of *G. aurea.*

5. **G. tenella,** *Fries in Act. Hafn.* x. 436, t. 2, fig. 6; erect, leaves oblong or ovate, pedicels (many of them) long, corolla tubular 5-lobed. *Fl. Dan.* t. 318; *Griseb. Gent.* 248, and in *DC. Prodr.* ix. 98; *Clarke in Journ. Linn. Soc.* xiv. 434. G. Koenigii, *Gunn. Fl. Norv.* ii. 102. G. glacialis, *Thomas in Vill. Delph.* i. 532. G. dichotoma, *Pall. Fl. Ross.* ii. 110; *Gmel. Fl. Sibir.* iv. t. 51, fig. B. G. tetragona, *Roth Tent. Fl. Germ.* ii. 290. G. nana, *Wulf. in Jacq. Misc.* i. 161, t. 18, fig. 3; *Griseb. Gentian.* 249, and in *DC. Prodr.* ix. 98. G. tristriata and pulmonaria, *Turcz. in Flora* 1834 *Beibl.* i. 19. G. pedunculata, *Royle*; *G. Don Gen. Syst.* iv. 182. Hippion longepedunculatum, *Schmidt in Roem. Arch.* i. 21, t. 3, fig. 5. Eurythalia pedunculata, *D. Don in Trans. Linn. Soc.* xvii. 516, and E. nana and glacialis, *G. Don Gen. Syst.* iv. 188, with others.

KASHMIR and W. HIMALAYA, alt. 10–14,000 ft., common.—DISTRIB. Arctic and Alpine Europe and N. and Central Asia.

Stem 2–10 in., erect or straggling, 4-lineolate, branched. *Leaves* $\frac{1}{3}$ by $\frac{1}{4}$ in., lowest spathulate. *Pedicels* often 1–3$\frac{1}{2}$ in., terminal, solitary. *Calyx-tube* hardly any; lobes $\frac{1}{5}$ by $\frac{1}{10}$ in., elliptic, often unequal. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{5}$ in.; lobes $\frac{1}{4}$ in., elliptic. *Capsule* $\frac{1}{3}$ in., oblong-linear, sessile.—Alpine examples, with flowers only

half the size of the fully-developed plant, are frequent. The type specimen (n. 1024 Griff. Journ.) is altogether an average Himalayan example; *G. minutissima*, Boiss. (Fl. Orient. iv. 71) founded on this number is evidently described from some other plant. Koch says that *G. tenella* in Germany is 4-merous; the Himalayan examples are almost uniformly 5-merous. As to the synonyms, if *G. nana* specifically differs from *G. tenella*, it is found in the Himalaya.

VAR. *falcata*, Turcz.; Griseb. Gentian. 249; corolla-tube ¼ in. long and nearly as broad.—W. Himalaya. DISTRIB. Caucasus.

VAR. *sikkimensis*; stems weak flexuose, leaves scarcely ¼ in., peduncles mostly long terminal 1-flowered, expanded corolla scarcely ¼ in.—Sikkim; alt. 12,000 ft.; Yeumtung, *J. D. H.*, *Elwes*.

SECT. 2. **Chondrophyllum** (*char. widened*). *Corolla* not more than 1 in., 5-lobed, tubular, with folds between the lobes. *Capsule* often exserted. *Seeds* small, globose oblong or falcate, usually trigonous, testa close, not (or most obscurely) reticulated. (See also *G. ornata*, var. n. 30.)

6. **G. recurvata,** *Clarke*; stems weak often branched, leaves remote ovate or oblong, pedicels scattered nodding in fruit, corolla twice as long as the calyx, capsule shortly obovoid compressed. Gentiana sp. 13, *Herb. Ind. Or. H. f. & T.*; sp. 6, *Clarke in Journ. Linn. Soc.* xiv. 434.

SIKKIM HIMALAYA; alt. 9–12,000 ft., *J. D. H.*, &c.

Stems 2–6 in. *Radical leaves* ½ by ⅓ in., spathulate-ovate; cauline ⅛–⅓ in., sessile, often connate, flaccid. *Pedicels* ¼ in., nodding in bud, erect in flower, recurved in fruit. *Calyx* ¼ in.; lobes ⅛ in., lanceolate, acute, entire, glabrous, always erect. *Corolla* ½–⅔ by ⅛–⅙ in., brilliant blue, folds fimbriate into linear-clavate blue laciniæ. *Capsule* ⅕ by ⅛–⅙ in., stalk as long as the corolla (at least in some cases). *Seeds* twice as long as broad, oblong or subfalcate, trigonous.

7. **G. aquatica,** *Linn. Amœn.* ii. 343; branches radical numerous weak little divided, cauline leaves small ovate or obovate marginate recurved, corolla less than ½ in., capsule short-obovoid compressed. *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 236, t. 9, fig. 6; *Griseb. Gentian.* 271, and in *DC. Prodr.* ix. 106; *Ledeb. Fl. Ross.* iii. 62. G. riparia, *Karel. et Kiril. in Bull. Soc. Imp. Mosc.* 1841, 706; *Griseb. in DC. Prodr.* ix. 186; *Clarke in Journ. Linn. Soc.* xiv. 434, *syn. excl.* G. Ledebourii, *Reich. Fl. Excurs.* 425. G. prostrata, *Clarke, l.c., not of Haencke.* Hippion aquaticum, *Schmidt in Roem. Arch.* i. 10. Ericoila aquatica, *Borkh. in Roem. Arch.* i. 27. Ericala (or Erycala) aquatica, *G. Don Gen. Syst.* iv. 192.

KASHMIR and WESTERN TIBET, alt. 13–16,000 ft.; *Thomson*, &c.—DISTRIB. N. Asia.

Branches 1–3 in. *Radical leaves* ¼–⅓ in., ovate; cauline ⅕ in., remote, usually obtuse, mucronate; margin hyaline, narrow. *Pedicels* ⅛–½ in., terminal, solitary. *Calyx* ¼–⅓ in.; lobes ⅛ in., lanceolate, acute, glabrous, entire, always erect. *Corolla-tube* hardly longer than the calyx, lobes short blue; folds bifid; fimbriæ none. *Capsule* ⅕ by ⅛–⅙ in.; stalk long, often ⅔ in., hence capsule long-exsert. *Seeds* ellipsoid, trigonous, not much longer than broad.—S. prostrata, *Haencke* (as understood by Ledebour and Boissier, *Fl. Orient.* iv. 72), differs by having the capsule nearly twice as long; it was collected in Cabul (Griff. n. 1049), never in British India.

VAR. *Karelini*; calyx elongate, corolla ½–⅔ in. narrowly tubular. *Griseb. in DC. Prodr.* ix. 106. G. prostrata, *Karel. & Kiril. in Bull. Soc. Imp. Mosc.* 1841, 705, not of *Haencke* (?).—Karakoram, alt. 13–14,000 ft. G. Karelini, *T. Thomson*, &c. DISTRIB. Altai.—Stems 1–2 in. fewer and smaller than those of the type. The Karakoram examples agree closely with Karel. & Kiril.'s *G. prostrata*; but their description differs in the corolla twice as long as the calyx; whereas, in the Indian plants the calyx is ½ in., as long as the corolla-tube.

8. **G. humilis,** *Steven.*; *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 235; branches radical numerous weak little divided, cauline leaves small oblong or elliptic not recurved nor marginate, corolla less than ½ in., capsule short-obovoid compressed. *Griseb. Gentian.* 272, and in *DC. Prodr.* ix. 106; *Ledeb. Fl. Ross.* iii. 63; *Boiss Fl. Orient.* iv. 72. G. aquatica, *Pall. Fl. Ross.* ii. t. 97, fig. 2, *not of Linn.* Ericala humilis; *G. Don Gen. Syst.* iv. 192.

WESTERN TIBET; Karakoram, alt. 13–16,000 ft.; *Thomson*, &c.—DISTRIB. Caucasus, N. Asia.

Closely resembling *G. aquatica*. *Corolla* ⅓ by $\frac{1}{10}$ in., usually white, sometimes blue. *Capsule* ⅛–⅙ in.

VAR. *evolutior*; corolla ½ by ¼ in. fine blue, capsule ¼ in.—Karakoram; *Thomson*, &c.

9. **G. pygmæa,** *Clarke*; stem ¼–1 in. simple 1-flowered, leaves minute remote ovate, corolla ¼–⅓ in. tubular.

WESTERN TIBET; Karakoram, Nubra, *Thomson*.

Leaves ⅛–⅙ in., ovate or obovate, margined. *Calyx* shorter than the corolla-tube; lobes lanceolate, acute, erect. *Corolla* blue; folds bifid; fimbriæ 0.—This looks like an excessively reduced form of *G. aquatica, Linn.*

VAR. *acuminata*; leaves imbricate acuminated.—Kashmir; Palgam, alt. 13,500 ft. *Clarke.*—Some of the examples are only ⅛ in. high, the expanded corolla ⅛ in. long.

10. **G. squarrosa,** *Ledeb. Fl. Ross.* iii. 64 and *Ic. Pl. Fl. Ross.* t. 14; branches radical numerous weak little divided, cauline leaves small obovate recurved, corolla less than ½ in., capsule short-obovoid compressed. *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 234, t. 9, fig. 3; *Griseb. Gentian.* 273, and in *DC. Prodr.* ix. 107. Ericala squarrosa, *G. Don Gen. Syst.* iv. 191.

ALPINE HIMALAYA and WESTERN TIBET, alt. 10–15,000 ft.; Karakoram, *Thomson*, &c.; Sikkim; *J. D. H.*, &c.—DISTRIB. Dahuria, Siberia.

Closely resembling *G. aquatica*, Linn., and hardly separable except by the calyx-teeth, which are ovate, mucronate, recurved even more strongly than in Ledebour's figure. The leaves are scarcely marginate.

11. **G. infelix,** *Clarke*; branches radical numerous small woody, leaves very small ovate, calyx-teeth ovate erect, corolla ⅛ in. tubular, capsule oblong subsessile. Gentiana, *Herb. Ind. Or. H. f. & T.* n. 9 and 10. *Clarke in Journ. Linn. Soc.* xiv. 435.

SIKKIM HIMALAYA; Yeumtong and Kankola, alt. 14–15,000 ft.; *J. D. H.* KUMAON; Barji Kang, alt. 14,700 ft., *Strachy & Winterbottom.*

Perennial; branches 1–1½ in., black, leafless, wiry below, leafy upwards, 1-flowered. *Leaves* ⅛–⅕ in., herbaceous, approximate, not margined. *Flower* subsessile. *Calyx* ⅛–⅙ in.; lobes $\frac{1}{16}$–$\frac{1}{12}$ in., obtuse, glabrous. *Corolla-lobes* shorter than the tube; folds subentire; fimbriæ 0. *Capsule* ⅓ by ⅛ in. *Seeds* oblong-ellipsoid, trigonous, twice as long as broad; testa close, smooth.

12. **G. quadrifaria,** *Blume Bijd.* 847; radical leaves ½–1½ in. ovate or lanceolate, cauline smaller coriaceous often marginate, calyx-lobes lanceolate acute rigid often subsquarrose, corolla ¼–½ in. *Griseb. Gentian.* 276, and in *DC. Prodr.* ix. 108. G. pedicellata, *Wall. Cat.* 4394; *Griseb. Gentian.* 273, and in *DC. Prod.* ix. 107; *Wight Ic.* t. 1328; *Clarke in Journ. Linn. Soc.* ix. 435. G. orbiculata, *Heyne*; *Wall. Cat.* 4395. G. abscondita, *Zenk. Pl. Ind.* 11, t. 13. G. zeylanica, *Griseb. Gentian.* 274, and in *DC. Prodr.* ix. 108. G. laxicaulis, *Zoll.*; *Miq. Fl. Ind. Bat.* ii. 568. G. pumila, *Griff. Ic. Pl. As.* t. 384, fig. 2. Gentiana sp. n. 749, *Griff. Itin. Notes*, 151. Ericala pedicellata, *D. Don in Trans. Linn. Soc.* xvii. 514. E. quadrifaria, procumbens and orbiculata, *G. Don Gen. Syst.* 190, 192, 193.

HIMALAYA, alt. 3–10,000 ft.; from Kashmir to Bhotan, common. KHASIA MTS.; alt. 3–5000 ft., common. MTS. of the DECCAN PENINSULA. CEYLON; common.—DISTRIB. Burma, Java, China.

Biennial or annual: stems usually numerous, 1–4 in., decumbent; sometimes erect, 4–10 in., simple, corymbose upwards. *Radical leaves* often rosulate, persistent; cauline $\frac{1}{4}$–$\frac{1}{2}$ in., ovate and lanceolate, mucronate, often squarrose. *Cymes* usually 3–5-flowered; pedicels 0–$\frac{1}{8}$ in. *Calyx* shorter than the corolla-tube, glabrous. *Corolla* blue, or yellowish-green; folds small, pale, bifid or emarginate; fimbriæ 0. *Capsule* $\frac{1}{8}$ by $\frac{1}{8}$–$\frac{1}{8}$ in., ellipsoid or ovoid, usually subexsert, *i.e.* stalk $\frac{1}{4}$–$\frac{1}{3}$ in. *Seeds* (in the Southern form) globose or obovoid, trigonous, smooth; in the Himalayan form narrower, ellipsoid.—The Indian and Java forms have very shining cartilaginous leaves; when decumbent they are called *G. abscondita, Zenk.* or *G. zeylanica, Griseb.* or *G. laxicaulis, Zoll.*; when more erect they are *G. quadrifaria, Blume*, or *G. orbiculata, Wall.* The abundant N. Indian plant is more herbaceous with green not shining leaves, and is *G. pedicellata, Wall.* or *Ericala procumbens, Don.* A form (?) with elongate, strict stems, and cauline leaves few, oblong, adpressed, flowers in early spring in Sikkim, and is doubtfully referred to *G. pedicellata* by *Sir J. D. Hooker.*

VAR. pilosula; leaves minutely ciliate-pubescent, calyx pilose.—Sikkim, alt. 6–8000 ft.; *J. D. H.*, &c.

13. **G. decemfida,** *Ham.*; *Don Prodr.* 127; radical leaves ovate mucronate cauline silvery marginate, flowers lateral and terminal short-pedicelled, corolla $\frac{1}{3}$ in. little exceeding the calyx, capsule shortly ellipsoid subincluded. *Wall. Cat.* 4392; *Griseb. Gentian.* 274, and in *DC. Prodr.* ix. 107. G. Royleana, *Wall. Cat.* 4393. Ericala decemfida, *D. Don in Trans. Linn. Soc.* xvii. 514. E. Royleana, *G. Don Gen. Syst.* iv. 192.

N.W. and CENTRAL HIMALAYA, from the Punjab to Nepal, alt. 1–8000 ft.; *Wallich, Madden*, &c.

Annual; stems 1–9 in., erect, with ascending branches. *Radical leaves* 1 by $\frac{1}{3}$ in., subsessile; cauline $\frac{1}{4}$–$\frac{1}{2}$ in., cartilaginous; uppermost lanceolate, minutely ciliate-pubescent on the margin. *Pedicels* 0–$\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ in.; lobes $\frac{1}{8}$ in., narrow-lanceolate, glistening. *Corolla* (in Wallich's examples) not longer than the calyx, sometimes half as long again; folds bifid; fimbriæ 0. *Capsule* $\frac{1}{5}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., stalk $\frac{1}{4}$ in. *Seeds* ellipsoid, very small, obscurely trigonous; testa close, smooth, minutely reticulated.

VAR. *aprica*; stems strict, inflorescence subpaniculate, pedicels often $\frac{1}{4}$ in., corolla $\frac{1}{3}$–$\frac{2}{5}$ in. often twice as long as the calyx. G. aprica, *Dcne. in Jacquem. Voy. Bot.* 112, t. 118; *Griseb. in DC. Prodr.* ix. 107.—Subtropical Punjab—Himalaya, alt. 1–3000 ft.; Siwaliks, Dehra Doon, Hooshiapore; *Griffith, Edgeworth*, &c. Uppermost leaves usually ciliate-pubescent on the margin; capsule included.

14. **G. argentea,** *Royle*; *Griseb. Gentian.* 275, and in *DC. Prodr.* ix. 107; radical leaves lanceolate mucronate cauline silvery marginate, flowers mostly terminal subcapitate, corolla $\frac{1}{3}$ in. equalling or exceeding the calyx, capsule ellipsoid subincluded. Ericala argentea, *D. Don in Trans. Linn. Soc.* xvii. 512.

KASHMIR and N.W. HIMALAYA, alt. 8–12,000 ft.; *Royle, Thomson*, &c.—DISTRIB. Afghanistan.

Stems 1–4 in., erect, branched. *Radical leaves* 1 by $\frac{1}{4}$ in.; uppermost ovate or oblong, falcate, glabrous, often closely investing the flower-heads. *Capsule* more than $\frac{1}{4}$ by $\frac{1}{8}$ in., stalk $\frac{1}{8}$ in. *Seeds* as of *G. decemfida*, from which this species is hardly distinguishable.

15. **G. micans,** *Clarke*; stems very numerous short, radical leaves small ovate cauline silvery marginate, corolla $\frac{1}{2}$ in., capsule oblong often exsert. G. argentea, var. *β*, *Clarke in Journ. Linn. Soc.* xiv. 436. Gentiana sp. 19, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Phullong, alt. 15,000 ft., *J. D. H.*

Annual; forming dense tufts 1–2½ in. diam.; branches 10–30 from the root, little divided. Radical *leaves* ¼ in., sessile; cauline leaves ¼ in., lanceolate, imbricate, cartilaginous. *Flowers* terminal, sessile, solitary, blue. *Calyx* ¼–⅓ in.; lobes ⅛–⅙ in., narrowly lanceolate, rigid, erect, glabrous. *Corolla* tubular, folds bifid; fimbriæ 0. *Capsule* ¼ by ⅛ in., stalk sometimes ¾ in., sometimes but ¼ in.; seeds as of *G. decemfida.*

16. **G. capitata,** *Ham. in Don Prodr.* 126; stem simple erect naked below, leaves ovate or oblong mucronate marginate, flowers capitate, capsule globose compressed subincluded. *Griseb. Gentian.* 275, and in *DC. Prodr.* ix. 107; *Clarke in Journ. Linn. Soc.* xiv. 436. G. marginata, *Wall. Cat.* 4391, not of *Griseb.* G. cephalodes, *Edgew. in Trans. Linn. Soc.* xx. 84; *Thoms. & Bacon in Hook. Lond. Journ. Bot.* iv. 637, and G. Baconi, t. 20.—Gentiana sp., *Griff. Ic. Pl. As.* t. 384, fig. 1.

Temperate Himalaya, alt. 4–12,000 ft.; from Kumaon to Bhotan; *Wallich, Griffith,* &c.

Stems 1–4 in., often naked at the time of flowering except the leaves mixed in the flower-head, sometimes leafy in the upper half. *Leaves* ½ by ¼–⅓ in., thick, somewhat shining, falcate. *Calyx* ¼ in.; lobes ⅛ in., oblong, acute, scarious-margined, glabrous. *Corolla* ¼–⅓ in., blue or white, folds emarginate; fimbriæ 0. *Capsule* ⅛ in. long and broad; stalk sometimes ⅙ in. *Seeds* very small, ellipsoid, nearly twice as long as broad, trigonous, smooth, scarcely reticulated.

Var. *Andersoni*; stem naked below, upper cauline leaves petioled ovate or elliptic herbaceous not marginate. G. Andersoni, *Clarke in Journ. Linn. Soc.* xiv. 436. Ericala capitata, *D. Don in Trans. Linn. Soc.* xvii. 512.—From Kumaon to Bhotan, alt. 5–8000 ft.; *J. D. H., T. Anderson,* &c. Khasia; *Simons,* &c. Probably only the fully developed state of *G. capitata*; having sometimes stout subquadrangular stems, and leaves 1¼ by ¾–1 in. D. Don seems to have got finer specimens for his description in Trans. Linn. Soc. than when he founded the species in Prodr. Fl. Nepal.

Var. *strobiliformis*; stem ¼–1 in., densely clothed with imbricated margined often round leaves, flowers solitary or few. Gentiana sp. n. 707, *Griff. Itin. Notes.* 147.—Himalaya, alt. 10–12,000 ft., from Kumaon to Bhotan; *Griffith,* &c.

17. **G. carinata,** *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 109; stem erect branched, radical leaves persistent oblong-lanceolate acute marginate, calyx-teeth shorter than the tube lanceolate acute erect, corolla ½ by ⅙ in. fimbriate, seeds small ellipsoid subtrigonous smooth not winged. G. marginata, *Clarke in Journ. Linn. Soc.* xiv. 437, *not of Griseb. nor of Wall.* Eurythalia carinata, *D. Don in Trans. Linn. Soc.* xvii. 516. Ericala carinata, *G. Don Gen. Syst.* iv. 189.

Kashmir and N.W. Himalaya, alt. 8–12,000 ft., frequent; *Royle, Falconer,* &c.

Annual; stems 1–6 in. Radical *leaves* 1¾ by ⅓ in., sessile, very acute, sub-3-nerved; cauline similar, smaller, not much falcate except those next the flowers. *Flowers* clustered, lateral and terminal, subsessile. *Calyx-tube* ¼ in.; lobes ⅙ in., acuminate. *Corolla* tubular, narrowly funnel-shaped upwards; folds bifid or subentire. *Capsule* ⅕ by ⅓ in., ellipsoid, compressed; stalk 0–⅕ in. *Seeds* altogether as of *Chondrophyllum*; Grisebach puts this in a section with winged seeds, but he does not appear to have seen these.

Var. *marginata*; leaves more crowded herbaceous falcate less acuminate, calyx-teeth falcate sometimes obovate acute, corolla without fimbriæ. G. marginata, *Griseb. Gentian.* 275, and in *DC. Prodr.* ix. 108, *not of Wall.* Ericala marginata, *D. Don in Trans. Linn. Soc.* xvii. 513.—Kashmir, alt. 11–14,000 ft.; *Falconer, Thomson,* &c. Distrib. Kashgar.

Var. *intermedia*; leaves as of *G. carinata* type, corolla without fimbriæ.—Kashmir, *Falconer.* These are finely-developed typical *G. carinata* with very acute straight leaves, and large corollas absolutely without fimbriæ (as often occurs).

18. **G. coronata,** *Royle Ill.* t. 68, fig. 1; stem short with spreading branches, leaves lanceolate acute, cyme terminal subcapitate, calyx-teeth ovate mucronate erect, corolla ½ by ¼ in. fimbriate. *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 109. Eurythalia coronata, *D. Don in Royle Ill.* 278, and in *Trans. Linn. Soc.* xvii. 515. Ericala coronata, *G. Don Gen. Syst.* iv. 193.

N. W. Himalaya; Kedarkanta, *Royle.*

Only known from Royle's figure, according to which it differs from *G. carinata* by the wider subcampanulate corolla.

19. **G. Hugelii,** *Griseb. in DC. Prodr.* ix. 108?; stem short-branched leafy many-flowered, leaves elliptic obtuse, calyx-teeth shorter than the tube elliptic obtuse, corolla ½ by ⅙ in. fimbriate, seeds small ellipsoid subtrigonous smooth not winged.

Western Tibet. *Hugel*; Zanskar, alt. 8–10,000 ft., *Thomson.*

Stem 1–3 in. *Leaves* 1¼ by ½ in., upper cauline smaller obovate obtuse. Otherwise as *G. carinata.*—Identified with *G. Hugelii* from Grisebach's description, which agrees very well except as to the testa which he describes as winged, whereas in Thomson's plant it is close, as in other species of *chondrophyllum.*

20. **G. nudicaulis,** *Kurz in Journ. As. Soc.* 1873, *pt.* ii. 235; stem erect leafless downwards when flowering, leaves lanceolate, flowers capitate or closely panicled, corolla ¾ in. much exceeding the calyx. *Clarke in Journ. Linn. Soc.* xiv. 437.—Gentiana sp. 16, *Herb. Ind. Or. H. f. & T.*

Khasia Mts., *Griffith* (Kew Distrib. n. 5819), &c. British Burma, alt. 4–7000 ft.; Nattoung, *Kurz*: Moolee, *Lobb, Parish.*

Stem 2–10, erect, simple below. *Leaves* 2 by ⅓ in., sessile, sub-3-nerved, obscurely margined. *Cymes* 2½ in. diam. in Khasia examples, dense-fld.; much smaller, capitate (in Burmese). *Calyx-tube* ⅕ in.; teeth ¼ in., lanceolate, acute, erect, scarious-margined. *Corolla* tubular, often nearly twice as long as the calyx, blue, plicate; fimbriæ 0 in Kurz's example at Kew; said to be present by C. B. Clarke *l. c.* *Capsule* nearly ⅓ by ⅙ in., ellipsoid, compressed; stalk ¼–⅓ in. *Seeds* small, ellipsoid, nearly twice as long as broad, trigonous; testa close, smooth.

Sect. III. **Pneumonanthe.** *Corolla* 1 in. or more (¾ in. in *G. crassa* and *sikkimensis*), 5-lobed with folds between the lobes; fimbriæ 0. *Seeds* globose, not winged; testa very lax, reticulated, glistening, white.

* *Flowers terminal, capitate; calyx-lobes very unequal.*

21. **G. crassa**, *Kurz in Journ. As. Soc.* 1873, *pt.* ii. 235; shrubby, leafless downwards, leaves broadly lanceolate, corolla ¾ by ⅕ in., tubular. *Clarke in Journ. Linn. Soc.* xiv. 440.

Pegu; Nattoung Summit, *Kurz.* Moulmein; *Parish.*

Stem 12–18 in., woody, terete, branched. *Leaves* 2 by ½–⅔ in., attenuated below, coriaceous, margins drying subcrenulate, connate at base into a short cylindric sheath round the stem. *Flowers* 4–16, capitate. *Calyx-tube* ¼ in.; lobes ⅙–⅕ in., linear or ovate, foliaceous, often 3 linear 2 foliaceous. *Capsule* ⅓ by ⅙ in.; stalk ¼–¾ in.

22. **G. sikkimensis**, *Clarke*; stems decumbent, radical leaves orbicular or elliptic obtuse, cauline elliptic or oblong, corolla ¾ by ⅕ in. tubular-funnel-shaped. Gentiana sp. n. 32 b., *Herb. Ind. Or. H. f. & T.* Gentiana sp. n. 31, *Clarke in Journ. Linn. Soc.* xiv. 439, *partly.*

Sikkim, alt. 10–14,000 ft., common; *J. D. H.*, &c.

Branches 1–8 in., herbaceous, 1–3 from the same root. *Radical leaves* ½ in., persistent at flowering time: cauline leaves 1 in., distant, uppermost enclosing the heads. *Flowers* 2–10, capitate. *Calyx-tube* ⅓ in.; lobes ¼ in., linear or elliptic, foliaceous,

often 3 linear 2 elliptic. *Corolla* $\frac{3}{4}$–1 in., not contracted at the mouth. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in.; stalk $\frac{1}{4}$–$\frac{3}{4}$ in.—Heads flowers and capsules exceedingly like those of *G. crassa.*

23. **G. Elwesii**, *Clarke*; stems erect, radical leaves elliptic subacute, cauline elliptic or oblong, corolla $1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in. inflated. Gentiana sp. 32, *Herb. Ind. Or. H. f. & T.* Gentiana sp. n. 31, *Clarke in Journ. Linn. Soc.* xiv. 439, *partly.*

SIKKIM HIMALAYA, alt. 13–15,000 ft.; Yeumtong and Lachoong, *J. D. H.*, *Elwes.*

Possibly a form of *G. sikkimensis*, but among the abundant material of that species, all have stems curved, heads not erect, basal leaves very obtuse, and corolla funnel-shaped. The corolla in *G. Elwesii* is inflated in the middle, somewhat contracted at the mouth, resembling that of the typical *Pneumonantheæ*, and considerably larger than in any example of *G. sikkimensis.*

** *Branches 1-flowered or stem simple* (1–4-fld. in *G. venusta* and *nubigena*).

24. **G. depressa**, *Don Prodr.* 125; stems very short or 0, leaves widely elliptic subacute, calyx-lobes ovate subacute marginate, intervening sinus very narrow, corolla $1\frac{1}{4}$ by $\frac{3}{4}$ in. tubular-campanulate. *Wall. Cat.* 4387; *Griseb. Gentian.* 269, and in *DC. Prodr.* ix. 109; *Clarke in Journ. Linn. Soc.* xiv. 438, *syn. excl.* Pneumonanthe depressa, *D. Don in Trans. Linn. Soc.* xvii. 511. Ericala depressa, *G. Don Gen. Syst.* iv. 189.

CENTRAL and EASTERN HIMALAYA; NEPAL, *Wallich*; SIKKIM, *Elwes.*

Branches 0–2 in., several or 1 from one root; barren branches short densely imbricated with leaves, fertile branches 0–2 in., with small leaves or naked below and a terminal tuft of leaves. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., sessile. *Flowers* solitary, sessile, blue. *Calyx-tube* $\frac{1}{3}$ in., campanulate; lobes $\frac{1}{4}$ in. *Corolla-lobes* $\frac{1}{5}$ in., ovate, acute, erect. *Capsule* $\frac{1}{2}$ by $\frac{1}{5}$ in., stalk 0–$\frac{1}{3}$ in.

25. **G. cachemirica**, *Dcne. in Jacquem. Voy. Bot.* iii. t. 117; branches often elongate, leaves elliptic or oblong mucronate, calyx-lobes spathulate-oblong acute, intervening sinus wide, corolla 1–$1\frac{1}{4}$ by $\frac{1}{2}$ in. tubular-campanulate. *Griseb. in DC. Prodr.* ix. 109. G. stipitata, *Edgew. in Trans. Linn. Soc.* xx. 84.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 9–13,000 ft.; *Falconer*, *Royle*, &c.

Branches 0–6 in., leafy, often numerous from the root. *Radical leaves* 1 by $\frac{1}{3}$ in., obovate-oblong, acute; cauline $\frac{1}{3}$–$\frac{2}{3}$ in. *Flowers* solitary, sessile, blue. *Calyx-tube* $\frac{1}{3}$ in., campanulate; lobes $\frac{1}{4}$ in. *Corolla-lobes* $\frac{1}{5}$ in., ovate, acute, erect. *Capsule* $\frac{1}{3}$ by $\frac{1}{6}$ in.; stalk $\frac{1}{5}$–1 in.—The capsule-stalk in an apparently ripe example of Edgeworth's is only $\frac{1}{3}$ in.; the length is not a safe specific character in this species or its allies. Numerous examples, stemless or nearly so, can hardly be distinguished from *G. depressa*, except by the wide sinus between the calyx-teeth.

26. **G. amœna**, *Clarke*; branches numerous short densely leafy, leaves obovate marginate obtuse, calyx-lobes broadly obovate marginate obtuse, corolla $\frac{3}{4}$–1 by $\frac{1}{3}$–$\frac{1}{2}$ in. campanulate. Gentiana sp. n. 30, *Herb. Ind. Or. H. f. & T.* Gentiana sp. 25, *Clarke in Journ. Linn. Soc.* xiv. 438.

SIKKIM HIMALAYA, alt. 14–18,000 ft.; Samdong, Momay, and Donkiah, *J. D. H.*

Tufted; stems 0–2 in., numerous, branched; barren branches succulent with sub-remote smaller leaves. *Leaves* $\frac{3}{8}$ in., densely imbricated (on the fertile branches), margin glistening. *Calyx* $\frac{1}{5}$ in.; lobes $\frac{1}{5}$ in., truncate or submarginate; margin glistening. *Corolla-lobes* $\frac{1}{6}$ in., ovate, subacute, erect. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$ in.; stalk $\frac{1}{4}$ in.

27. **G. phyllocalyx**, *Clarke*; stems solitary suberect 1-flowered, leaves obovate obtuse not marginate, calyx-lobes large resembling the leaves, corolla $1\frac{1}{4}$–$1\frac{3}{4}$ by $\frac{1}{2}$–$\frac{2}{3}$ in. tubular inflated. Gentiana sp. n. 26, *Clarke in Journ. Linn. Soc.* xiv. 439.

SIKKIM HIMALAYA, alt. 13–15,000 ft.; Kankola and Lachen, *J. D. H.*

Stems 1–5 in. *Radical leaves* $\frac{2}{3}$ by $\frac{1}{2}$ in., obovate, obtuse, herbaceous, sub-1-nerved, persistent at fruiting time; cauline similar, rather smaller, remote. *Calyx-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in., elliptic, green, not marginate. *Corolla* blue, somewhat contracted at the mouth. *Capsule* $\frac{3}{4}$ by $\frac{1}{4}$ in.; stalk often 1 in.—Has larger flowers, and very much larger calyx-lobes, than *G. venusta*.

28. **G. venusta**, *Wall. Cat.* 4389; stemless or nearly so, leaves elliptic or obovate obtuse, calyx-lobes small oblong acute, corolla 1 by $\frac{1}{4}$–$\frac{1}{3}$ in. tubular. *Griseb. Gentian.* 276, and in *DC. Prodr.* ix. 109; *Clarke in Journ. Linn. Soc.* xiv. 439. Ericala venusta, *G. Don Gen. Syst.* iv. 189.

ALPINE WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 11–14,000 ft.; *Blinkworth, Gen. Munro*, &c.

Stems 0, or 3 in., prostrate: flowers 1–3 subsessile on the short, densely leafy, annual shoots. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx-tube* $\frac{1}{4}$ in., lobes $\frac{1}{6}$–$\frac{1}{4}$ in., linear or oblong, sinus intervening wide. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. by $\frac{1}{4}$–$\frac{1}{3}$ in.

29. **G. tubiflora**, *Wall. Cat.* 4388; stemless or nearly so, leaves imbricate ovate or elliptic acute, calyx-teeth ovate-lanceolate acute, corolla 1 by $\frac{1}{4}$ in. tubular. *Griseb. Gentian.* 277, and in *DC. Prodr.* ix. 110. Ericala tubiflora, *G. Don Gen. Syst.* iv. 189.

ALPINE HIMALAYA; Nepal, *Wallich*; WESTERN TIBET, *Munro*; Sikkim, alt. 14–16,000 ft., *J. D. H.*

Stems $\frac{1}{4}$–1 in. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in. *Corolla-lobes* $\frac{1}{6}$–$\frac{1}{5}$ in., triangular, erect. *Capsule* $\frac{1}{2}$ by $\frac{1}{5}$ in.; stalk 1–$1\frac{3}{4}$ in.—The fruiting examples are very distinct from *G. venusta* by the long-exsert capsule; the flowering are hardly separable by the more acute leaves and calyx-teeth.

30. **G. ornata**, *Wall. Cat.* 4386; branches many from the root elongate leafy 1-flowered, cauline leaves oblong or sublinear acute, calyx-lobes oblong or linear, corolla 1–$1\frac{3}{4}$ in. tubular funnel-shaped. *Griseb. Gentian.* 277, and in *DC. Prodr.* ix. 110; *Bot. Mag.* t. 6514. Pneumonanthe ornata, *G. Don Gen. Syst.* iv. 194.

ALPINE CENTRAL and EASTERN HIMALAYA, alt. 11–15,000 ft.; Nepal, *Wallich*; Sikkim, *J. D. H.*, &c., common.

Branches 1–5 in., curved. *Radical leaves* 0 or inconspicuous at flowering time; cauline $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., acute, bases connate into a short tube. *Calyx-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{4}$ in.; sinus wide. *Corolla* $\frac{1}{2}$ in. diam. (in Wallich's example); lobes $\frac{1}{5}$ in., triangular, acute, erect. *Capsule* $\frac{1}{2}$ by $\frac{1}{5}$ in.; stalk $\frac{1}{4}$–$1\frac{1}{2}$ in.—The abundant material shows the capsule (fully ripe) often included, and nearly as often far exserted.

VAR. *meiantha*; barren shoots with minute leaves, corolla $\frac{1}{3}$–$\frac{1}{2}$ in.—Sikkim; Jongri, alt. 13,000 ft., *Clarke*.—Leaves of the barren shoots $\frac{1}{8}$ in., imbricate, recurved (as in *G. humilis* or *squarrosa*), of the flowering shoots nearly as in *G. ornata*. *Calyx-tube* $\frac{1}{5}$ in., lobes $\frac{1}{5}$ in., not so much reduced as the corolla. *Capsule* $\frac{1}{4}$ in., subincluded in the corolla-tube. *Testa* white, lax, altogether as of *G. ornata*. A very dubious plant.

31. **G. nubigena**, *Edgew. in Trans. Linn. Soc.* xx. 85; leaves oblong-linear, calyx-lobes oblong much shorter than the tube with wide sinus intervening, corolla $1\frac{1}{2}$ by $\frac{2}{3}$ in. funnel-shaped.

ALPINE HIMALAYA, alt. 16–18,000 ft.; from Kashmir to Sikkim; *Edgeworth, Thomson, J. D. H.*, &c.

Stems 0–6 in., suberect, usually 1–2 flowering, and 1–2 barren from the same root. *Lower leaves* 2½ by ¼ in.; cauline shorter, connate at base into a short tube. *Flowers* often 1–3 on each branch, shortly pedicellate or subspicate. *Calyx-tube* ½ in., teeth ⅕ in.; sinus often plicate. *Corolla-lobes* ⅙ in. acute. *Capsule* 1 by ¼ in., with the stalk ¼–½ in., included.

VAR. *parviflora*; corolla 1 by ¼ in. subtubular. Gentiana sp. n. 39, *Herb. Ind. Or. H. f. & T.*—Sikkim, alt. 17,000 ft.; Kinchinjhow, *J. D. H.*—This again is a doubtful plant; it appears to have been collected with *G. nubigena.*

SECT. IV. **Kurroo.** Stoutish herbs. *Flowers* racemose or spicate. *Corolla* 1 in. or more, 5-lobed with folds between the lobes; fimbriæ 0. *Seeds* oblong trigonous or falcate, acute or subcaudate, not winged; testa close, not (or minutely obscurely) reticulated.

32. **G. Kurroo**, *Royle Ill.* t. 68, fig. 2; leaves oblong or linear, flowers solitary or few racemose, calyx-lobes subequal linear, corolla 2 by ¾ in. *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 110; *Clarke in Journ. Linn. Soc.* xiv. 440; *Bot. Mag.* t. 6470. Pneumonanthe Kurroo, *D. Don in Royle Ill.* p. 278, and in *Trans. Linn. Soc.* xvii. 509.

KASHMIR and N.W. HIMALAYA, alt. 5–11,000 ft., common; *Royle*, &c.

Rootstock stout, perennial: flowering stems 2–12 in., simple. *Radical leaves* 3 by ⅓ in., tufted; cauline 1 in., linear, connate at the base into a tube. *Flowers* 1–4 on each stem, sometimes truly racemed, more often an uppermost pair of leaves close to the calyx. *Calyx-tube* ⅓–½ in., not keeled; lobes ⅓–½ in., linear, rarely suboblong. *Corolla-lobes* ½ in., ovate, acute, sky-blue. *Capsule* ¾ by ⅕ in.; stalk ¼–½ in. *Seeds* twice as long as broad, acute at one end, subcaudate at the other.

33. **G. decumbens**, *Linn. f. Suppl.* 174; leaves oblong, flowers terminal clustered and axillary, calyx very unequal often spathaceous or some of the teeth ovate suddenly linear-pointed, corolla ¾–1 in. *Bunge in Nouv. Mem. Soc. Imp. Mosc.* i. 212; *Bot. Mag.* tt. 705, 723; *Griseb. Gentian.* 279, and in *DC. Prodr.* ix. 110; *Ledeb. Fl. Ross.* iii. 64; *Clarke in Journ. Linn. Soc.* xiv. 440. G. adscendens, *Pall. Fl. Ross.* ii. 106, t. 94. Pneumonanthe adscendens, *Schmidt in Roem. Arch.* i. 10. Dasystephana adscendens, *Borkh. in Roem. Arch.* i. 26.—Gentiana sp., *Gmel. Fl. Sibir.* iv. 103, t. 51, fig. A.

BALTISTHAN and WESTERN TIBET, alt. 11–15,000 ft., eastwards to Lahul, *Thomson*, &c., common on the Karakorum.—DISTRIB. Dahuria, Siberia.

Rootstock stout; flowering stems 2–10 in., simple. *Radical leaves* 2 by ¼–⅓ in.; cauline 1–1½ in., oblong or elliptic, connate at the base into a tube. *Flowers* 1–2 subsessile in each upper axil, the upper 3–7 approximate, subcapitate, the axillary clusters subremote or wanting. *Calyx-tube* ⅓ in., lobes ⅕ in.; but the tube is often split down one side nearly to the base, the lobes very unequal, 2–4 linear, 1–2 ovate obtuse or obovate with linear teeth. *Corolla* funnel-shaped, lobes rounded. *Capsule* ½ by ⅙ in.; stalk ¼–⅓ in. *Seeds* oblong, trigonous, falcate, twice as long as broad, subobtuse at both ends, testa close.

34. **G. dahurica,** *Fisch. in Act. Soc. Nat. Scr. Mosq.* iii. 63, *with fig.*; leaves oblong, flowers terminal clustered with axillary often added, calyx-lobes equal oblong-linear, corolla ¾–1 in. *Bunge in Nouv. Mem. Soc. Imp. Mosc.* i. 213. G. Olivieri, *Griseb. Gentian.* 278, and in *DC. Prodr.* ix. 110; *Clarke in Journ. Linn. Soc.* xiv. 440; *Boiss. Fl. Orient.* iv. 76.

W. HIMALAYA; *Thomson, Hay.*—DISTRIB. Beloochistan, Cabul, Dahuria, Soongaria.

Only differs from *G. decumbens* by the equal calyx; and it may be questioned whether the figure, *Gmel. Fl. Sibir.* t. 51, fig. A (on which *G. decumbens* is founded) may not rather represent *G. dahurica.*

SECT. V. **Crossopetalum.** Erect, branched herbs. *Flowers* scattered, pedicelled. *Corolla* ¾–2 in., 4-lobed; folds between the lobes obscure or 0; fimbriæ 0. *Seeds* ellipsoid or subglobose; testa reticulated, hardly lax, not glistening-white.

35. **G. detonsa,** *Fries in Act. Hafn.* x. 435, t. 1, fig. 3; leaves oblong-linear, calyx-tube terete funnel-shaped, lobes ovate-lanceolate, corolla ¾–1¼ in., seeds subglobose. *Griseb. Gentian.* 256, and in *DC. Prodr.* ix. 101; *Ledeb. Fl. Ross.* iii. 59; *Clarke in Journ. Linn. Soc.* xiv. 437. G. ciliata, *Pall. Fl. Ross.* ii. 101, t. 92, fig. 2; *Bot. Mag.* t. 639. G. barbata, *Froel. Gentian.* 114; *Bunge in Nouv. Mem. Soc. Imp. Mosc.* i. 223, t. 9, fig. 1. G. brachypetala, *Bunge l. c.* i. 225, t. 11, fig. 3. Gentianella detonsa *and* barbata, *G. Don Gen. Syst.* iv. 179.

N. KASHMIR and WESTERN TIBET, alt. 9–15,000 ft., common in the Karakorum.—DISTRIB. Europe, N. Asia, and N. America.

Stems 8–24 in., much branched (in the Indian plants). *Leaves* 1½ by ¼ in., distant, scarcely connate at the base. *Peduncles* 1–8 in., mostly very long. *Calyx-tube* ½ in.; lobes ⅓ in., unequal, 2 opposite ovate-lanceolate, 2 lanceolate. *Corolla-tube* 1 by ¼ in., lobes ⅓ in., fimbriate or serrate at least at the apex; glands near the base of the tube very obscure. *Capsule* ¾ by ¼ in., stalk ⅓ in. *Seeds* hardly longer than broad; testa reticulated and minutely scaly.—The numerous Indian examples are uniform; but according to Grisebach (*DC. Prodr.* ix. 110), the 5-merous *G. serrata* is only a var., and, according to Asa Gray (*Man. Bot.* 387), *G. crinita*, Froel., cannot be separated. There is a wide range in size of corolla, length and fimbriation of its lobes, in the extra-Indian examples.

VAR. *Stracheyi*; leaves broader, calyx-tube strongly 4-keeled, corolla ¾–2¼ in., seeds much larger ellipsoid. Gentiana sp., nn. 7 & 8, *Herb. Ind. Or. H. f. & T.*—N. Kashmir and W. Tibet; alt. 8–13,000 ft.; *Strachey & Winterbottom*, &c. Sikkim; Tungu, alt. 12–13,000 ft., *J. D. H.*—So far as the Indian material is concerned this var. looks a distinct species, except that the corolla is very variable in size; but among the American *G. crinita* there are examples with a keeled calyx.

36. **G. contorta,** *Royle Ill.* 278, t. 69, fig. 3; leaves elliptic, flowers subracemose, calyx-lobes ovate acute, corolla 1 in. with 4 large oblong glands near the base within, seeds minute subglobose. *D. Don in Trans. Linn. Soc.* xvii. 508; *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 94.

N. W. HIMALAYA, alt. 6000 ft., *Thomson*, *Edgeworth*.

Stem 4–8 in. *Radical leaves* 0 at flowering time; cauline 1 by ⅓–½ in., narrowed but hardly connate at the base. *Stems* 2–7-flowered; pedicels ¼–¾ in. *Calyx-tube* ⅓ in., terete, funnel-shaped; lobes ⅓ in., somewhat unequal. *Corolla-tube* ⅔ in.; lobes ⅓ in., oblong, subentire; basal glands much larger than in *G. detonsa*, reminding D. Don l. c. of barren stamens. *Capsule* ½ by ⅕ in., stalk ⅙ in. *Seeds* much smaller than in *G. dentosa* and very obscurely reticulated, but not well ripe.

SECT. VI. **Stylophora.** *Stem* hollow, ¼–½ in. thick. *Flowers* and capsules large. *Style* ½–¾ in.

37. **G. stylophora,** *Clarke*; leaves large elliptic lower petioled, peduncles axillary 1–8 in. 1-flowered with 2 bracts below the flower, capsule 2 by 1 in. Gentiana sp. 40, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 11–14,000 ft.; Chola and Kankola, *J. D. H.*; Jongri, *Clarke*.

Flowering stem 3–6 ft., simple. Lower *leaves* 12 by 4 in., strongly 5-nerved, upper 5 by 2 in., sessile, shortly connate at the base. *Calyx* widely funnel-shaped, tube ½ in.; lobes ¾ by ⅓ in., subobtuse. *Corolla* (apparently very succulent, badly preserved) widely funnel-shaped, fimbriate in the throat (?). *Stamens* attached halfway up the corolla-tube, filaments linear; anthers ¼ in., oblong. *Stigmas* ⅙–¼ in., oblong. *Seeds* ⅙ by $\frac{1}{12}$ in.; testa lax, reticulated, scrobiculate.—This fine plant is remote from *G. lutea* in the inflorescence and the widely funnel-shaped corolla; it

may constitute a new genus when the corolla is fully known. It has the habit of *Frasera* and the large *Swertias*, from which it differs in the gamosepalous calyx and long style.

10. **JAESCHKEA,** *Kurz.*

Herbs, erect, or small decumbent. *Leaves* opposite, linear-lanceolate or ovate, bases shortly connate. *Flowers* paniculate or terminal pedunculate, blue. *Sepals* lanceolate or orbicular. *Corolla* tubular; lobes 5, short, triangular-lanceolate, valvate in bud. *Stamens* 5, attached at the sinus of the corolla-tube, filaments short, linear; anthers oblong-sagittate, blue or greenish. *Ovary* 1-celled, placentæ little intruded; style short, linear, stigma 2-lobed; ovules much fewer than in *Gentiana*. *Capsule* elliptic, sessile or shortly stalked, separating to the base into its two carpels, splitting the style into halves. *Seeds* ellipsoid; testa close, smooth not reticulated.—Species 3; Alpine W. Himalayan.

1. **J. gentianoides,** *Kurz in Journ. As. Soc.* 1870, pt. ii. 230, t. 13, and in *Flora*, 1871, 275; erect, panicled, leaves narrowly lanceolate, sepals lanceolate, seeds $\frac{1}{20}$ in. *Clarke in Journ. Linn. Soc.* xiv. 441. Gentiana oligosperma, *Griseb. in DC. Prodr.* ix. 94. G. Jaeschkei (*by misprint* Taeschkei), *Kurz in Trimen Journ. Bot.* 1867, 241.

KASHMIR and WESTERN HIMALAYA, alt. 8–13,000 ft.; abundant, *Jaeschke*, &c.

Stem 8–30 in., rigid, slender, somewhat lineolate. *Leaves* $1\frac{1}{4}$ by $\frac{1}{4}$ in., sessile. *Flowers* panicled, numerous; pedicels 0–$\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ by $\frac{1}{20}$ in., acute, sub-3-striate. *Corolla* expanding when only $\frac{1}{6}$ in., but gradually enlarging till in fruit (on the same stem) more than $\frac{1}{2}$ in.; tube subventricose; lobes (in fruit) $\frac{1}{5}$ by $\frac{1}{8}$ in. *Stamens* shorter than the corolla-lobes, blue or green when dry. *Capsule* $\frac{1}{3}$ in., ellipsoid, compressed, very shortly stalked. *Seeds* 10–30, much larger than in *Gentiana*.

2. **J. latisepala,** *Clarke in Journ. Linn. Soc.* xiv. 441; erect, panicled, leaves oblong acuminate, sepals unequal ovate obovate or orbicular, seeds $\frac{1}{20}$ in. Gentiana canaliculata, *Royle*; *D. Don in Trans. Linn. Soc.* xvii. 509; *G. Don Gen. Syst.* iv. 182. G. Moorcroftiana, *Griseb. in DC. Prodr.* ix. 96, *partly, not of Wall.*

N. KASHMIR and WESTERN TIBET, alt. 9–13,000 ft.; common, *Royle*, &c.

Closely resembling *J. gentianoides*; but rather stouter, with broader leaves. *Sepals* $\frac{1}{3}$ by $\frac{1}{6}$–$\frac{1}{3}$ in., hardly striate; uppermost leaves, when near the flowers and bractiform, ovate. *Capsule* sessile. *Seeds* as of *J. gentianoides*.

3. **J. microsperma,** *Clarke*; small, diffuse, leaves elliptic, flowers small long-peduncled terminal on the branches, sepals oblong, seeds minute.

ALPINE SIKKIM; Samdong, alt. 11–17,000 ft., *J. D. H.*

Stem $\frac{1}{2}$–$1\frac{1}{2}$ in. Lower *leaves* $\frac{1}{3}$ by $\frac{1}{4}$ in., cauline $\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* $\frac{1}{6}$ by $\frac{1}{10}$ in., subacute. *Corolla-tube* $\frac{1}{5}$ in.; lobes $\frac{1}{10}$ in. *Anthers* blue or greenish. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., subsessile. *Seeds* $\frac{1}{40}$ in., suborbicular, but, except in size, closely agreeing with those of *Jaeschkea*.—This small plant has doubtless been passed for *Gentiana tenella*, small examples of which it much resembles.

11. **PLEUROGYNE,** *Eschsch.*

Annual herbs, decumbent branched or erect. *Leaves* opposite. *Flowers* panicled, or long-peduncled. *Sepals* elliptic or linear, often unequal. *Corolla* rotate, without (or with very obscure) basal pits or depressions; tube very short with or without fimbriæ; lobes elliptic, usually acute. *Stamens* 4–5, attached to the corolla-tube, filaments linear somewhat flattened; anthers ob-

long or ovate. *Ovary* 1-celled, placentæ little intruded; stigma sessile. *Capsule* oblong or elliptic, sessile or nearly so, carpels separating. *Seeds* very many, small, subglobose, smooth, testa close not (or obscurely) reticulate.—Species 7; in the Mts. of Europe, Asia, and N. America.

1. **P. carinthiaca,** *Griseb. Gentian.* 310, and in *DC. Prodr.* ix. 122; branching from the base, cauline leaves ovate or elliptic, pedicels elongate, sepals $\frac{1}{4}$ in. elliptic, corolla 5-merous lobes $\frac{1}{3}$ in. fimbriate near the base. *Reich. Ic. Pl.* t. 1045; *Boiss. Fl. Orient.* iv. 77. P. Stelleriana, *G. Don Gen. Syst.* iv. 188. P. carinata, *Edgew. in Trans. Linn. Soc.* xx. 85, *ex descr.* P. himalayensis, *Klotzch in Reis. Pr. Walden. Bot.* 91, t. 68. Swertia carinthiaca, *Wulf. in Jacq. Misc.* ii. 53, t. 6. S. rotata, *Pall. Fl. Ross.* iv. t. 89, fig. 3. Gentiana carinthiaca, *Froel. Gentian.* 103. G. Stelleriana, *Cham. & Schl. in Linnæa,* i. 188. G. rotata, *M. Bieb.*; *Bunge in Nouv. Mem. Soc. Imp. Mosc.* i. 254. Lomatogonium carinthiacum, *Braun in Flora,* 1830, 221.

W. HIMALAYA and WESTERN TIBET; alt. 10–13,000 ft., from Kashmir and Kumaon to the Karakorum, frequent, *Thomson,* &c.—DISTRIB. Alps, Caucasus, Cabul, Central Asia, Siberia.

Stems 1–6 in., usually very numerous. *Radical leaves* 1 by $\frac{1}{3}$ in., obovate, persistent or sometimes disappearing; cauline $\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at the base. *Pedicels* $\frac{1}{2}$–2 in., mostly long. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$ in., subacute or obtuse. *Corolla-tube* very short; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in., blue, with green nerves, fimbriate near the base. *Anthers* somewhat large, oblong, often as long as the filaments. *Capsule* $\frac{1}{2}$ in., oblong, acute, sessile. *Seeds* numerous, small, ellipsoid.

2. **P. Thomsoni,** *Clarke*; branching from the base, cauline leaves small elliptic, pedicels elongate, sepals $\frac{1}{8}$ in. elliptic, corolla 5-merous lobes $\frac{1}{3}$ in. naked at the base.—Pleurogyne sp. 2, *Herb. Ind. Or. H. f. & T.*

W. TIBET, alt. 15–18,000 ft.; *Thomson, Strachey.*

Cauline leaves $\frac{1}{8}$–$\frac{1}{4}$ in. *Corolla-lobes* at base naked or with obscure depressions. *Anthers* large, oblong, often as large as the filaments.—Mr. Bentham doubts whether this should not be removed to *Swertia,* but the depressions at the base of the petals are never well marked, and the habit is so exactly that of *P. carinthiaca* that some examples are hard to distinguish from that, while others are less than 1 in., with very small flowers.

3. **P. brachyanthera,** *Clarke*; branching from the base, cauline leaves small elliptic, pedicels elongate, corolla 4-merous lobes $\frac{1}{4}$–$\frac{1}{3}$ in., anthers ovate very small much shorter than the filament.

WESTERN TIBET; Karakorum, alt. 13,000 ft., *Clarke.*

Cauline leaves $\frac{1}{8}$–$\frac{1}{4}$ in. *Sepals* $\frac{1}{8}$ in., elliptic. *Corolla-lobes* at base slightly fimbriate.—The anthers are unlike any examples of *P. carinthiaca* or *P. Thomsoni.* Resembles a starved state of *P. carinthiaca.*

4. **P. spathulata,** *A. Kerner Nov. Sp.* ii. 8; branching from the base, cauline leaves linear-oblong, pedicels elongate, sepals narrowly oblong about half the length of the corolla.

N. KASHMIR; alt. 13,000 ft., *Stoliczka,* &c. LAHUL (*A. Kerner*).

Closely allied to *P. carinthiaca.* *Radical leaves* $1\frac{1}{2}$ in., linear-spathulate; cauline $\frac{3}{4}$ by $\frac{1}{8}$ in. *Corolla-lobes* often $\frac{3}{8}$ in., more than twice as long as the sepals. *Anthers* large, oblong. *Capsule* and *seeds* as in *P. carinthiaca,* but rather larger.

5. **P.? minor,** *Benth. in Gen. Pl.* ii. 816; stem erect, cauline leaves ovate or elliptic, flowers 4-merous panicled pedicels $\frac{1}{8}$–1 in., corolla $\frac{1}{4}$–$\frac{1}{3}$ in. Ophelia minor, *Griseb. in DC. Prodr.* ix. 126; *Wight Ic.* t. 1332; *Dalz. & Gibs. Bomb Fl.* 156; *Clarke in Journ. Linn. Soc.* xiv. 446.

W. Deccan Peninsula; in the Ghats, from Bombay southwards; common in the Nilgherries.

Stem 2–9 in., usually undivided at the base, without radical leaves. Cauline *leaves* ½ by ¼ in., sessile. *Sepals* ⅛ by ⅛ in. elliptic. *Corolla* white or clear blue, nearly 5-partite; segments oblong, base naked or minutely glandular, scarcely pitted. *Anthers* small, ovate, much shorter than the filament. *Ovary* sessile, oblong; stigma sessile, shortly bilobed. *Capsule* ¼ in., oblong. *Seeds* minute, subglobose.—Genus doubtful; in the symmetrical erect habit, 4-merous flowers, corolla without green nerves, it approaches *Swertia Sect. Ophelia* (see *Swertia Beddomei*).

12. **SWERTIA,** *Linn.*

Annual or perennial herbs. *Leaves* opposite except in *S. alternifolia. Flowers* blue, lurid, or whiteish, sometimes with yellow glands; cymes in thyrsoid or corymbose panicles. *Sepals* 4–5, lanceolate, rarely ovate. *Corolla* rotate; lobes 4–5, twisted to the right; on each lobe (or on the short corolla-tube below its base) are 1 or 2 pits depressions or glands, naked or partly covered by a basal scale; margins of pits fimbriate all round, or at its apex only; scale naked or tips fimbriate. *Stamens* 4–5, attached near the base of the corolla, free, rarely monadelphous, filaments linear complanate, often more or less dilated downwards; anthers oblong ovate or hastate, versatile. *Ovary* 1-celled, placentæ little intruded; style 0 or short rarely linear-cylindric, stigmas 2. *Capsule* sessile, ovate or oblong, separating into its 2 carpels. *Seeds* various, many, rarely few, small or minute, testa close or very lax or winged reticulate.—Species 50; in Europe, Asia, and Africa, principally in the mountains.

In the species with one pit at the very base of each corolla-lobe, this pit seems homologous with the spur of *Halenia*. There is a passage from the species with a depressed broad viscous spot, fimbriate on the margins only to those which have 2 small lateral linear vertical glands; among these *S. cærulea*, with very small depressions, should perhaps be removed to *Pleurogyne*. In *S. bimaculata*, where there are 2 green viscous spots, scarcely depressed, in the middle of the corolla-lobes, the morphology is obscure.

Subgenus I. **Ophelia.** *Stems* annual or once-flowering, erect, panicled, solid, virgate. *Radical leaves* 0 at the time of flowering.

* *Flowers all (or most of them) 5-merous.*

† *Sepals almost free.*

1. **S. purpurascens,** *Wall. Cat.* 4379; leaves oblong or lanceolate 3–1-nerved, filaments dilated downwards united into a short tube free from the corolla, style long stigmas sublinear. Ophelia purpurascens, *D. Don in Trans. Linn. Soc.* xvii. 526; *Griseb. Gentian.* 315, and in *DC. Prodr.* ix. 124; *Wight Ill.* t. 157, bis 3, fig. *d.* O. Dalhousiana, *Griseb. Gentian.* 313, and in *DC. Prodr.* ix. 123. O. ciliata, *G. Don Gen. Syst.* iv. 178.

Temperate N.W. Himalaya, alt. 5–12,000 ft.; from Kashmir to Kumaon; abundant near Dalhousie and Dhurmsala.

Stems 8–36 in., terete or 4-lineolate. *Leaves* 1½ by ½ in., base narrowed, lowest subobtuse, uppermost acute, glabrous. *Panicles* divaricate, many-flowered, leafy; pedicels often clustered. *Sepals* ⅛ in., oblong, 1-nerved. *Corolla-lobes* ¼ in., ovate, acute, purple or dark red, reflexed in flower; pits solitary near the base of each lobe, horse-shoe shaped, naked. *Stamen-tube* erect, and filaments puberulous; anthers elliptic-lanceolate, much acuminate. *Seeds* $\frac{1}{50}$ in. diam., globose, smooth, light-yellow when ripe.—Grisebach's type specimens of *S. purpurascens* and *Dalhousiana* are identical. This species is recognised at once by the red-purple much-reflexed corolla-lobes. There is a strong purple band near the base of the corolla-lobe which is

usually interrupted in the middle, hence from behind the corolla-lobe appears biglandulose near the base; the foveola or pit is below this, in the corolla-tube, and is a watch-pocket slit, never more than one to each corolla-segment. *O. ciliata* is founded on some scraps of Royle's with most minutely ciliate petioles, nowise differing from the type. There is a form (? dimorphic) in which the stamens are not half so long as the corolla-lobes, the anthers linear.

2. **S. paniculata,** *Wall. Cat.* 4374, and *Pl. As. Rar.* iii. 3, t. 205; leaves oblong or lanceolate 3–1-nerved, filaments linear separately attached to the corolla-tube, style long stigmas linear. Ophelia paniculata, *D. Don in Trans. Linn. Soc.* xvii. 525; *Griseb. Gentian.* 314, and in *DC. Prodr.* ix. 124; *Bot. Mag.* 5687, fig. 5, 6. O. Wallichii, *G. Don Gen. Syst.* iv. 178.

TEMPERATE W. HIMALAYA, alt. 5–8000 ft.; from Kashmir to Nepal, *Wallich*, &c.

Close resemblance to *S. purpurascens*, when dried. *Sepals* ⅕ in., oblong, acute, sub-1-nerved. *Corolla-lobes* ¼ in., ovate, acute, white in the upper half, patent not reflexed in flower; pit very near the base of the corolla, 1 to each lobe, naked; near the base of the corolla-lobe are 2 purple or lurid-green subglandular marks, sometimes confluent into one. *Filaments* hardly dilated downwards, not puberulous; anthers oblong, not hastate. *Capsule* ⅓ in., elliptic-lanceolate, acuminate. *Seeds* as of *S. purpurascens* but rather smaller.—The var. *brachypetala*, Griseb. Gentian., 314, was founded on Wallich's type of *S. paniculata*; but Grisebach subsequently marked examples of *S. dilatata* (n. 4 below) as var. *brachypetala*.

3. **S. Griffithii,** *Clarke*; leaves narrowly lanceolate 3–1-nerved, panicles dense, calyx-lobes lanceolate rigid 3-nerved connate below, filaments linear free, style long stigmas linear. Gentianea n. 1006, *Griff. Itin. Notes*, 189.

BHOTAN; Lamnos, alt. 9000 ft., *Griffith* (Kew Distrib. 5883).

Possibly an eastern var. of *S. paniculata*. Examples are 4–7 in., very rigid, branched, dense with leaves and fruit. *Leaves* 1 by ⅛ in. *Pedicels* mostly ⅛–¼ in. *Capsules* rather smaller than in *S. paniculata*.

4. **S. dilatata,** *Clarke*; leaves lanceolate 3–1-nerved, filaments much dilated for more than half their length puberulous not connate into a tube at the base, style cylindric stigmas sublinear.

SIKKIM HIMALAYA, alt. 4–12,000 ft., common; *J. D. H.*, &c. NEPAL; *Wallich*.

Resembling *S. paniculata*, but with larger flowers and capsules; and the stamens more like those of *S. purpurascens*. *Leaves* glabrous, base minutely ciliate. *Sepals* ⅓–½ in., elliptic-lanceolate, acuminate, much broader than in *S. paniculata*. *Corolla* usually shorter than the sepals; lobes greenish yellow, a transverse purple continuous band near the base; a pit horse-shoe-shaped on the corolla-tube, one for each lobe. *Filaments* usually more dilated than in *S. purpurascens*, sometimes nearly to the summit, while at the base they are contracted, separate. *Capsule* ⅓–½ in.

VAR. *pilosa*; leaves pilose on both surfaces with ciliate margins and nerves, pedicels and sepals ciliate. Nepal; *J. Scully*.

5. **S. tetragona,** *Clarke*; leaves lanceolate 3–1-nerved, filaments linear free, style 0 stigmas of 2 closely approximated hemispheric plates. Ophelia tetragona, *Edgew. in. Trans. Linn. Soc.* xx. 86.

TEMPERATE HIMALAYA, alt. 5–8000 ft.; from Kashmir to Simla, abundant; *Edgeworth*, *Thomson*, &c.

Resembling in general appearance *S. paniculata*. *Sepals* ⅙ in., narrowly lanceolate. *Corolla-lobes* more than ¼ in., whitish; near the base on either side of each lobe is an oblong vertical hairy gland; no pit at the base of the corolla-tube but a shining obscure concavity, of which (as in other species) the two oblong glands are the more prominent upper margins. *Anthers* oblong, hastate to the middle. *Capsule*

¼–⅓ in., oblong, obtuse. *Seeds* small, nearly as of *S. paniculata.*—This very abundant plant has been overlooked as *S. paniculata* and as *S. angustifolia.*

6. **S. cordata,** *Wall. Cat.* 4378; leaves sessile ovate acute 5–3-nerved, filaments linear free, style cylindric stigmas subhemispheric. Ophelia cordata, *Griseb. Gentian.* 315, and in *DC. Prodr.* ix. 124; *Clarke in Journ. Linn. Soc.* xiv. 445, *not of Don.* O. nuda, *Klotszch in Reis. Pr. Wald. Bot.* 91, t. 67.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 4–12,000 ft., from Kashmir and the Karakorum to Bhotan; abundant westward. KHASIA MTS., alt. 3–5000 ft., very common.

Stem 8–36 in., 4-lineolate. *Leaves* 1¼ by ¾ in., obtuse, base often cordate. *Panicles* large, many-fld., branches ascending or patent; pedicels 0–1½ in., often fascicled, unequal. *Sepals* ⅓ by ⅛ in., ovate-lanceolate, acute. *Corolla-lobes* ¼–⅜ in., elliptic or oblong, acute or obtuse, white or with purplish nerves; above the base of the lobe is a large orbicular viscous yellowish spot hardly depressed, not fimbriate, traversed obscurely by the central nerve, not bifid; no pits in the corolla-tube. *Filaments* linear, subhypogonous, obscurely connate at the very base; anthers oblong, scarcely hastate. *Capsule* (in Wallich's example) ½ by ⅕ in., often hardly ¼ in. *Seeds* $\frac{1}{25}$ in. diam., subglobose, ornamented with long raised lines of rows of glands.—Described from Wallich's Kumaon example, which is *Ophelia cordata β laxa*, Grisebach l. c.; and has large flowers and capsules; the Khasia form is nearly the same. Some Kashmir examples have very small flowers with obtuse lobes, others have very large flowers; all have the ovate sessile leaves, the corolla-lobes with one large spot each, and the peculiarly marked seeds. *Ophelia cordata*, Don, is said by him to have been founded on Wallich's *Swertia Chirata* and *cordata* thrown together; the description refers mainly (as to the petals and glands) to *S. Chirata.* This species, like *S. purpurascens*, has a form with very short filaments and linear anthers. It also occurs (in N. Kashmir) with double flowers.

7. **S. bimaculata,** *H. f. & T.*; *Clarke in Journ. Linn. Soc.* xiv. 449; leaves elliptic-lanceolate petioled 3-nerved, corolla-lobes marked half-way up with 2 green spots, filaments linear free, stigmas sessile hemispheric. Ophelia bimaculata, *Sieb. & Zucc. Fam. Nat.* 35. *So Mokou*, iv. t. 55.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 5–8000 ft.; *Griffith, J. D. H.*, &c., abundant about Darjeeling.

Stem 2–6 ft., stout, 4-angular, corymbose upwards. *Leaves* 3 by 1¼ in., or upper cauline sometimes 6½ by 2¾ in., glabrous, petioled or at least much narrowed at the base. *Flowers* numerous, 4–5 merous; pedicels ½–1½ in., mostly long. *Sepals* ¼ in., elliptic, mostly obtuse. *Corolla-lobes* ⅓–½ in., broadly elliptic, white or yellowish-green, with black spots in their upper half; the two green spots in the middle viscid, scarcely depressed, no pits in the corolla-tube. *Filaments* attached on the corolla-tube; anthers oblong, not hastate. *Capsule* ¾ by ¼ in. *Seeds* $\frac{1}{40}$ in., cuboid-globose, smooth, obscurely reticulated.

8. **S. macrosperma,** *Clarke*; leaves subsessile oblong or subovate acute, corolla-lobes with 2 small oblong glands near their base, stigmas subsessile, seeds few large smooth. Ophelia macrosperma, *Clarke in Journ. Linn. Soc.* xiv. 448.—Ophelia sp. n. 15, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–6000 ft., very common; *Griffith, H. f. & T.*, &c.

Stem 6–48 in., quadrangular, diffusely branched upwards. *Leaves* 1¾ by ⅓ in., or in small plants subovate. *Pedicels* ¼–2 in., mostly long. *Sepals* ⅛ in., lanceolate. *Corolla-lobes* ⅜ in., lanceolate, pale lurid blue or nearly white; the two glands vertical, parallel, hardly depressed, naked or hairy. *Filaments* linear, free, on the corolla-tube; anthers hastate. *Capsule* ⅙ by ⅛ in. *Seeds* $\frac{1}{13}$ in., ellipsoid.—Of this also double-flowered examples occur wild. The whole habit and seeds of this species show it to be very closely allied to *Halenia.*

†† *Calyx distinctly gamosepalous.*

9. **S. racemosa,** *Wall. Cat.* 4377; leaves subsessile elliptic-lanceolate 3-nerved, filaments free linear slightly dilated below, style long cylindric, stigmas short oblong. Ophelia racemosa, *Griseb. Gentian.* 319, and in *DC. Prodr.* ix. 127; *Clarke in Journ. Linn. Soc.* xiv. 447.

NEPAL; *Wallich.*

Stems 18 in., 4-lineolate. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in. *Panicles* many-fld., leafy; pedicels 0–$\frac{1}{2}$ in., mostly short, fascicled, unequal. *Calyx-tube* $\frac{1}{12}$ in., funnel-shaped; lobes $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate, very acute, almost keeled. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., oblong, acute; at the very base of each, almost in the corolla-tube, is a pit covered by a scale, teeth of its margin lanceolate-linear black not hairy. *Filaments* on the corolla-tube; anthers oblong, not hastate. *Capsule* $\frac{1}{3}$ in. *Seeds* somewhat large, ellipsoid, smooth.—On Wallich's sheets, some *S. Chirata* is mixed with this, which seems to have troubled D. Don as noticed by Grisebach.

** *Flowers all 4-merous.*

† *Species of North India.*

10. **S. Chirata,** *Ham.*; *Wall. Cat.* 4372; cauline leaves subsessile elliptic acute 5-nerved, corolla lurid-green-yellow near the base of each lobe 2 glandular depressions each terminated by long hairs. Gentiana Chirayita, *Roxb.*; *Fleming in Asiat. Res.* xi. 167. G. Chirayta, *Roxb. Fl. Ind.* ii. 71. G. Chirata, *Wall. Pl. As. Rar.* iii. 33, t. 252. ? G. floribunda, *Don Prodr.* 127. Agathotes Chirata, *D. Don in Trans. Linn. Soc.* xvii. 552. Ophelia Chirata, *Griseb. Gentian.* 320, and in *DC. Prodr.* ix. 127; *Clarke in Journ. Linn. Soc.* xiv. 447; *Benth. & Trim. Med. Pl.* iii. t. 183.—Ophelia sp., 17, 19, and 20, *Herb. Ind. Or. H. f., & T.*

TEMPERATE HIMALAYA, alt. 4–10,000 ft. from Kashmir to Bhotan. KHASIA MTS., alt. 4–5000 ft.; frequent.

Stem 2–5 feet, 4-lineolate or subterete. *Leaves* 2 by $\frac{3}{4}$ in., the lower often much larger sometimes petioled. *Panicles* large, leafy, many-fld.; pedicels 0–$\frac{3}{4}$ in., fascicled, mostly short. *Calyx-lobes* $\frac{1}{6}$ in., lanceolate. *Corolla-lobes* $\frac{1}{4}$ in., ovate, acuminate, more or less purple-nerved; the glandular depressions are green, shallow, often submarginal, rarely close together or subconfluent, with a fringe of long white or pink hairs at the summit. *Filaments* linear, free; anthers oblong. *Style* cylindric; stigmas oblong. *Capsule* $\frac{1}{4}$ in. and upwards, ovate, acute. *Seeds* $\frac{1}{50}$ in., polyhedral, smooth; testa close, not (or microscopically) reticulated.—D. Don (*in Trans. Linn. Soc.* xvii. 522) has reduced to *S. Chirata* his *Gentiana floribunda.* But there must be some error, for he describes the corolla as 5-fid, tubular, blue, and both it and the leaves as hairy. *Ophelia* sp. 20, H. f. & T., is the Khasia plant which has strongly 3-nerved leaves attenuated at the base, and of which some examples have woody short barren branches with terminal tufts of leaves, others annual erect flowering stems. This species is so exceedingly near the two next, that the quotations of all the older authors are uncertain; Bentley and Trimen's figure is the one to be relied upon. While many of the other Ophelias are gregarious and could be collected in great quantity, this occurs scattered (from Khasia to Kashmir); yet all the medicinal *Chiretta* of the Bengal bazaars collected by Dr. Wise proved to be *S. Chirata* true, without any admixture of the closely allied species.

11. **S. lurida,** *Royle ms.*; cauline leaves subsessile elliptic acute 5-nerved, corolla lurid green-yellow with 2 glandular depressions without hairs near the base of each lobe. Ophelia lurida, *D. Don in Trans. Linn. Soc.* xvii. 527; *Griseb. in DC. Prodr.* ix. 124. O. lucida, *G. Don Gen. Syst.* iv. 179.

N.W. HIMALAYA, *Royle, Falconer*; Naini Tal, *Col. Davidson.*

Corolla-lobes $\frac{1}{10}$ in. *Capsule* $\frac{1}{8}$ in.—Differs from *S. Chirata* in the smaller flowers and capsules.

12. **S. alata,** *Royle ms.*; cauline subsessile leaves ovate acute 5-nerved, corolla lurid green-yellow near the base of each lobe one round depression. Agathotes alata, *D. Don in Trans. Linn. Soc.* xvii. 523. Ophelia alata, *Griseb. in DC. Prodr.* ix. 127; *Bot. Mag.* t. 5687, fig. 12.

TEMPERATE W. HIMALAYA, alt. 4–6000 ft.; from Kashmir to Kumaon, common.

Stem 4-angular, often 4-winged. *Calyx-lobes* $\frac{1}{4}$ in. and upwards. *Corolla-lobes* purple-veined, often shorter than the calyx; glandular depression minutely pubescent round the margin or glabrous, covered at the base by a slit-like gland.—Closely resembling *S. Chirata.*

13. **S. nervosa,** *Wall. Cat.* 4383; leaves elliptic-lanceolate 3-nerved narrowed at the base, sepals oblong-linear exceeding the corolla, corolla-lobes greenish-yellow with one orbicular gland near the base of each lobe, stigmas subsessile hemispheric. *Griseb. Gentian.* 317, and in *DC. Prodr.* ix. 125.

TEMPERATE NEPAL and SIKKIM, alt. 6–9000 ft., common; *Wallich, J. D. H.*, &c.

Stem 1–3 feet, 4-lineolate or 4-winged. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in., upper cauline subpetiolate. *Panicles* many-flowered; pedicels $\frac{1}{8}$–$1\frac{1}{2}$ in., very variable. *Sepals* $\frac{2}{3}$ by $\frac{1}{8}$ in., sometimes longer. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, acute, purple-nerved or dotted; gland large, sometimes viscous, little depressed, nearly naked; sometimes a distinct pit covered by a slit-like fold with a hairy margin. *Filaments* linear (in one form short); anthers oblong, scarcely hastate. *Capsule* $\frac{1}{3}$ by $\frac{1}{5}$ in., ovate. *Seeds* $\frac{1}{40}$ in., polyhedral; testa somewhat loose, glistening along the edges.

14. **S. angustifolia,** *Ham. in Don Prodr.* 127; leaves narrowly lanceolate sub-1-nerved narrowed at the base, sepals oblong-linear often longer than the corolla, corolla-lobes white or blueish oblong acute with one large orbicular gland near the base. *Wall. Cat.* 4373, and *Pl. As. Rar.* iii. 2, t. 204. Ophelia angustifolia, *D. Don in Trans. Linn. Soc.* xvii. 524; *Griseb. Gentian.* 320, and in *DC. Prodr.* ix. 126; *Bot. Mag.* 5687, fig. 3, 4.

SUBTROPICAL HIMALAYA, alt. 1–6000 ft. from the Chenab to Bhotan, common.

Generally resembling *S. nervosa*, the leaves narrower. *Sepals* equalling the corolla in Wallich's type, often $\frac{1}{2}$–$\frac{2}{3}$ in. and greatly exceeding it; sometimes considerably shorter than the corolla, when the species must be distinguished from *S. pulchella* by the larger gland. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., usually white with blue or black dots, never lurid; the large depression usually minutely pubescent on the margin, and partly closed by a scale. *Stamens*, capsule, and seeds nearly as in *S. nervosa.*

15. **S. pulchella,** *Ham. in Wall. Cat.* 4375; leaves sessile narrowly lanceolate sub-3-nerved, sepals lanceolate much shorter than the corolla, corolla-lobes ovate-lanceolate with one orbicular gland near the base. Ophelia pulchella, *D. Don in Trans. Linn. Soc.* xvii. 525; *Griseb. Gentian.* 318, and in *DC. Prodr.* ix. 126. O. porrigens, *G. Don Gen. Syst.* iv. 178. O. pratensis, *Edgew. in Trans. Linn. Soc.* xx. 85.

SUBTROPICAL HIMALAYA, the Terai, alt. 500–4000 ft., from Kangra to Bhotan, very common. KHASIA MTS., alt. 1–4000 ft., common.

Hardly differing from *S. angustifolia* but by the shorter sepals which are hardly half as long as the corolla in Wallich's type. *Corolla-lobes* pale-blue with deeper-blue nerves and dots, erect and connivent in young fruit; orbicular depression very near the base of the corolla, covered by a small scarcely pubescent scale or naked.

VAR. *elegans*; sepals exceeding the corolla or much shorter than it (on the same branch), corolla-lobes subpatent in young fruit. S. elegans, *Wall. Cat*, 4376, *not of Wight*. Swertia florida, *Wall. Cat.* 4382. Ophelia florida, *G. Don Gen. Syst.* iv. 178; *Griseb. in DC. Prodr.* ix. 125. Himalaya, Khasia, British Burma, frequent over nearly the whole area of *S. pulchella* type. Distrib. Ava.—This variety has

been often referred to *S. angustifolia* which has less acute sepals, larger glands on the corolla-lobes, but it may be doubted whether it is a distinct species.

†† *Species of the Deccan Peninsula and Ceylon.*—(Filaments linear, not or scarcely dilated, free or nearly so; anthers oblong, not or obscurely cordate. Style short cylindric, stigmas oblong. Capsule ovate, acute, about as long as the corolla. Seeds $\frac{1}{40}$ in. polyhedral; testa close, minutely reticulated, so that the seeds appear often glistening).

16. **S. affinis,** *Clarke*; leaves lanceolate 3-nerved base narrowed, cymes forming an elongate lax panicle, corolla-lobes $\frac{1}{4}$ by $\frac{1}{8}$ in. oblong shortly acute or subobtuse. Ophelia affinis, *Arn. in Wight Ill.* ii. 175, t. 157, bis fig. 3 *b*. O. elegans, *Wight Ic.* t. 1331.

Deccan Peninsula, alt. 2–4000 ft.; from Chota Nagpore to the Pulneys, *Wight*, &c.

Stem 1–3 feet. *Leaves* $1\frac{3}{4}$ by $\frac{1}{3}$ in. *Panicle-branches* sharply quadrangular; pedicels 0–1 in., flowers not clustered. *Sepals* $\frac{1}{5}$ in., narrowly lanceolate. *Corolla-lobes* white or with blue nerves; orbicular gland near the base large, completely covered by a large scale with pubescent margin.—This in its long panicle and smaller flowers differs from the other Deccan species, but is very near *S. pulchella*, var. *elegans*, Wall., of which it may be the South Indian form, as Wight supposed.

17. **S. corymbosa,** *Wight ms.*; upper cauline leaves sessile ovate or oblong subacute 3-nerved, cymes forming a level-topped corymb, corolla-lobes $\frac{1}{4}$ by $\frac{1}{6}$ in. broadly oblong shortly acute. Ophelia corymbosa, *Griseb. Gentian.* 317, and in *DC. Prodr.* ix. 125; *Wight Ic.* t. 1329; *Bot. Mag.* t. 4489.

Mts. of the S. Deccan Peninsula, alt. 4–7000 ft.; common.

Stem 8–20 in., quadrangular or 4-winged. Lower cauline *leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., spathulate-obovate, obtuse, subpetioled; upper cauline $\frac{1}{2}$ by $\frac{1}{3}$ in., ovate, obtuse, mucronate. *Corymb* wide; pedicels 0–$\frac{1}{2}$ in., clustered. *Sepals* $\frac{1}{4}$ in., narrowly lanceolate. *Corolla-lobes* white with blue-nerves or pale-blue, one gland at the base of each covered by a scale with pubescent margin.—Described from Wight's type; *Bot. Mag.* t. 4489, is a much drawn-up garden specimen with the upper leaves spathulate, and the flowers much bluer than common. The following varieties are here described from the type specimens, but numerous intermediates occur which Wight was unable to refer to any one variety.

Var. *elatior*, Griseb. in DC. Prodr. ix. 125; upper cauline leaves $2\frac{1}{2}$ in. elliptic lanceolate acute, sepals $\frac{1}{3}$ in. acute, corolla-lobes $\frac{1}{3}$ in. very obtuse.—Nilgherries, Bombay; *Dalzell*.

Var. *Grisebachiana*; upper cauline leaves $1\frac{1}{4}$ by $\frac{1}{3}$ in. acute. Ophelia Grisebachiana, *Wight Ic.* t. 1330.—Pulneys and Nilgherries; *Wight*. Stem terete, obscurely lineolate; lower cauline leaves small, somewhat fleshy, narrowly oblong. This variety approximates to *S. zeylanica*.

Var. *Lawii*; lower cauline leaves sessile ovate-lanceolate subobtuse 5–3-nerved, upper narrow, corymb lax sometimes few-flowered. Ophelia Lawii, *Arn. in Wight Ill.* ii. 175, t. 157. bis fig. 3 *c*. O. pauciflora, *Dalz. in Hook. Kew Journ.* iii. 211; *Dalz. & Gibs. Bomb. Fl.* 156.—Bombay Ghats; *Dalzell*, *Ritchie*.

18. **S. trichotoma,** *Wall. Cat.* 4381; upper cauline leaves elliptic-lanceolate, pedicels umbelled or clustered at the ends of the cyme-branches, corolla-lobes $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$ in. oblong acuminate often caudate. Ophelia trichotoma, *W. & A. ms.*; *Wight Ill.* ii. 175, t. 157, fig. 3 *g*. O. umbellata, *Wight l.c.* fig. 3 *a*; *Bot. Mag.* t. 5397.

Nilgherries, alt. 6–8000 ft.; common.

Only differs from *S. corymbosa* in the inflorescence and very acuminate corolla-lobes. *Pedicels* $\frac{1}{3}$–$1\frac{1}{4}$ in., numerous, sometimes forming perfect umbels; sometimes much shorter, when the examples have been mistaken for *S. decussata*.

19. **S. decussata,** *Nimmo in Grah. Cat. Pl. Bomb.* 249; leaves sessile ovate obtuse 5–3-nerved, corymbs very dense, corolla-lobes $\frac{1}{6}$ by $\frac{1}{8}$ in. broadly oblong shortly acute. Ophelia densifolia, *Griseb. in DC. Prodr.* ix. 125. O. alba, *Arn. in Wight Ill.* t. 157, bis fig. 3 *f*. O. multiflora, *Dalz. in Hook. Kew Journ.* ii. 135; *Dalz. & Gibs. Bomb. Fl.* 156.

W. Deccan Peninsula, alt. 3–6000 ft.; from the Concan to Travancore, common.

Stem 1–3 ft., terete or 4-winged. *Leaves* $1\frac{1}{4}$ by $\frac{3}{4}$ in., numerous, approximate, decussate. *Pedicels* 0–$\frac{1}{2}$ in., mostly short. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly lanceolate. *Corolla-lobes* white with blue nerves, with one round depression at the base of each, covering scale shortly hairy not very large.

20. **S. zeylanica,** *Walker ms.*; leaves sessile short lanceolate subobtuse fleshy, cymes terminal umbel-like, corolla-lobes $\frac{1}{4}$ in. broadly elliptic shortly acute. Ophelia zeylanica, *Griseb. Gentian.* 316, and in *DC. Prodr.* ix. 124.

Ceylon, alt. 5–7000 ft.; common.

Stem 8–20 in. terete or scarcely 4-lineolate. *Cauline leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., lower leaves similar but subspathulate. *Cymes* many or few-flowered; pedicels $\frac{1}{8}$–$\frac{1}{2}$ in. mostly short. *Corolla* deep blue.—Much resembling *S. corymbosa*, var. *Grisebachiana*, but having flowers considerably smaller.

21. **S. Beddomei,** *Clarke;* leaves sessile ovate subobtuse 3-nerved, cymes forming terminal flat-topped dense corymbs, corolla-lobes $\frac{1}{8}$–$\frac{1}{6}$ in. elliptic subacute.

Deccan Peninsula; Canara, Beddome; Mysore; *Lobb.*

Stem 12 in., quadrangular. *Leaves* $\frac{2}{3}$ by $\frac{1}{2}$ in., distant, lower smaller disappearing. *Pedicels* 0–$\frac{1}{4}$ in., mostly short. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., elliptic or oblong, scarcely acute. *Corolla-lobes* elliptic, acute; one orbicular depression at the base of each, covered by an oblong scale fimbriated at the tip. *Capsule* not seen.—Not very nearly allied to any of the foregoing, but very near *Pleurogyne β. minor*, Benth., of which it has been supposed to be merely a luxuriant form.

Subgenus II. **Euswertia.** *Rootstock* perennial with tufted long-petioled leaves; annual flowering stems erect, often thick, hollow (see also n. 10 *S. Chirata*).

22. **S. Hookeri,** *Clarke*; cauline leaves elliptic scarcely connate at the base, cymes axillary dense distant, flowers 4-merous, seeds much compressed narrowly winged.—Gentiana sp. n. 41, *Herb. Ind. Or. H. f. & T.*

Sikkim Himalaya, alt. 12–13,000 ft.; Lachen & Choongtam, *J. D. H.*, *King.*

Stem $1\frac{1}{2}$–4 ft., hollow, $\frac{1}{4}$–$\frac{1}{2}$ in. thick. *Radical leaves* 4 by 1 in., spathulate-elliptic; cauline 3 by 1 in., narrowed at both ends, sessile, 5-nerved. *Peduncles* hardly any; pedicels $\frac{1}{8}$–2 in., nodding with flowers. *Sepals* $\frac{1}{3}$ by $\frac{1}{4}$ in., ovate, hardly acute. *Corolla-lobes* $\frac{2}{3}$ by $\frac{1}{3}$ in., obtuse, purplish with blue nerves; pit at the base of each deep, naked. *Filaments* linear, little dilated; anthers oblong blue. *Style* $\frac{1}{10}$ in., stigmas very short. *Capsule* $\frac{2}{3}$ by $\frac{1}{3}$ in., shining brown. *Seeds* $\frac{1}{8}$ in. diam., discoid, exceedingly thin, smooth.

23. **S. Rex,** *Clarke*; cauline leaves elliptic acuminate connate into a tube at the base, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe above the base nearly naked, seeds compressed narrowly winged.

Sikkim Hamalaya, alt. 11,000 ft.; Singalelah, *Clarke.*

Stem 3–5 ft., hollow, $\frac{1}{3}$ in. thick. Cauline *leaves* 7 by 3 in., 7-nerved; tube at the base $1\frac{1}{4}$ in., lax. *Cymes* 6 in., erect; pedicels 1–4 in. *Sepals* $\frac{1}{2}$ by $\frac{1}{8}$ in., lanceolate, 3-nerved, entire. *Corolla-lobes* $\frac{3}{4}$ by $\frac{1}{2}$ in., ovate, subacute, lurid-blue with green nerves; glandular depressions 2, above the base $\frac{1}{3}$ the way up, lower margin slightly produced minutely hairy so as to form an imperfect scale covering the lower part of

the depression. *Filaments* linear, flattened; anthers ovate, small. *Stigmas* subsessile. *Capsule* $\frac{2}{3}$–$\frac{3}{4}$ by $\frac{1}{2}$ in. *Seeds* $\frac{1}{8}$ in. diam., smooth.

24. **S. speciosa,** *Wall. Cat.* 4384; cauline leaves elliptic acuminate bases connate, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe close to the base subconfluent prominently fimbriate, seeds compressed narrowly winged. *Griseb. Gentian.* 334, and in *DC. Prodr.* ix. 133.

WESTERN HIMALAYA, Kumaon; *Wallich, Munro*; Gurwhal; Ramni, alt. 10,500 ft., *Strach. & Winterb.*; Kashmir; Sonamurg, alt. 9000 ft., *Levinge.*

Stem 1$\frac{1}{2}$–4 ft., hollow, $\frac{1}{5}$ in. thick. *Radical leaves* long-petioled, cauline 5 by 2 in., narrowed downwards, 7-nerved; tube at the base $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* short, pedicels $\frac{1}{4}$–3 in. *Sepals* $\frac{1}{3}$ by $\frac{1}{6}$ in., ovate, acute, serrate, much overlapping at the base. *Corolla-lobes* $\frac{3}{4}$ by $\frac{1}{5}$ in., spathulate-oblong, shortly acute; fimbriæ $\frac{1}{8}$ in. *Stamens, capsule* and seeds nearly as of *S. Rex.*—Described from Wallich's type, but the var. *perfoliata* is mixed in Wallich's collection. The Kashmir example has the corolla smaller.

VAR. *perfoliata*; sepals narrower subentire, corolla-lobes $\frac{3}{4}$ by $\frac{1}{6}$ in. much acuminate. *G. Don Gen. Syst.* iv. 176. S. speciosa, *D. Don in Trans. Linn. Soc.* xvii. 518.—Gurwhal and Punjab Himalaya, alt. 11,000 ft.; *Royle, Edgeworth,* &c.

25. **S. alternifolia,** *Royle Ill.* 278, t. 67, fig. 2; leaves all alternate, cauline elliptic-lanceolate amplexicaul, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe close to the base subconfluent prominently fimbriate. *D. Don in Trans. Linn. Soc.* xvii. 520; *Griseb. in DC. Prodr.* ix. 133.

WESTERN HIMALAYA; Kumaon and Gurwhal, alt. 11–12,000 ft.; Choor and Kedarkanta, *Royle*; Jungleg (on the Upper Pabur), *Edgeworth.*

Resembling altogether *S. speciosa*, but all the cauline leaves, including those containing cymes, are alternate. All authors describe the flowers as golden or yellow, but it is probable that they have no authority except Royle's artist, and that the flowers are really lurid blue.

26. **S. petiolata,** *Royle*; *D. Don in Trans. Linn. Soc.* xvii. 519; lower cauline leaves long-petioled oblong connate into a tube upper often sessile, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 much fimbriate, seeds polyhedral scrobiculate not winged. *Griseb. in DC. Prodr.* ix. 133. S. speciosa, *G. Don Gen. Syst.* iv. 176, *not of Wall.*

WESTERN HIMALAYA; Kashmir, alt. 9–12,000 ft., frequent; Gulmurg, Tragbol, &c., *Royle, Atkinson, Levinge,* &c.—DISTRIB. Cabul.

Stem 1–3 ft., hollow, $\frac{1}{8}$–$\frac{1}{6}$ in. thick. Lower *cauline leaves* 3$\frac{1}{2}$ by 1 in., 5-nerved, petiole 2–3 in.; tube at the base $\frac{1}{4}$–1 in.; leaves at the base of the cyme 1$\frac{1}{2}$ by $\frac{1}{2}$ in., sessile, hardly connate; upper cauline leaves petioled or sessile. *Peduncles* $\frac{1}{2}$–1$\frac{1}{2}$ in., mostly 3–5-flowered; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{4}$ by $\frac{1}{8}$ in., lanceolate, acute (in Royle's example), sometimes $\frac{1}{2}$ by $\frac{1}{6}$ in. *Corolla-lobes* $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., acute subentire (in Royle's example) with orbicular glands; in other examples emarginate or suberose at the tip, with glands elliptic or elongate; corolla lurid grey or nearly white with blue-green nerves, the glands yellow, the tip green. *Style* hardly any, stigmas short. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* corrugate-cristate (D. Don) *i.e.* testa lax in long series of glandular ridges, approaching in structure those of *S. cordata*, but much larger.

VAR. *lahulensis*; sepals $\frac{2}{5}$ by $\frac{1}{8}$ in., corolla-lobes $\frac{3}{4}$–1 by $\frac{1}{6}$ in. spathulate-oblong greenish erose at the tips, glands elongate considerably above the base of the corolla-lobes. S. lahulensis, *A. Kerner Nov. Sp.* ii. 4.—Lahoul; *Jaeschke.* The glands are fimbriate on the upper edge, and also at their base, not on the sides; and, being $\frac{1}{10}$ in. long, there seem to be 2 small hairy glands some way up the corolla-lobes, and a ring of hairs at the very base about the filaments. But there are examples which come between A. Kerner's type and the *S. petiolata* of Royle.

27. **S. Thomsoni,** *Clarke*; lower cauline leaves long-petioled oblong or elliptic scarcely connate upper often sessile, cymes forming a narrow panicle, flowers 5-merous, glands near the base of the corolla-lobes obscure, seeds smooth narrowly or irregularly winged.

WESTERN HIMALAYA; Kashmir; Sonamurg, alt. 9250 ft., *Thomson, Clarke.*

Resembling in leaves and habit *S. petiolata*, but with more numerous smaller flowers and capsules. *Peduncles* often 6 in. *Sepals* $\frac{1}{4}$ by $\frac{1}{10}$ in., acute. *Corolla-lobes* $\frac{1}{3}$ by $\frac{1}{5}$ in., subobtuse; glands 2 yellow spots very close to the base of the corolla, altogether obscure in T. Thomson's fine examples, usually naked, rarely minutely hairy. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. *Seeds* $\frac{1}{18}$–$\frac{1}{20}$ in., globose, somewhat angular, wing very partial and irregular; testa close, smooth, microscopically reticulate (hence glistening).

28. **S. cuneata,** *Wall. Cat.* 4380; cauline leaves spathulate-oblong or petioled, peduncles long mostly 3–1-flowered, corolla 5-merous, glands linear vertical 2 near the edge of each corolla-lobe, seeds $\frac{1}{25}$ in. angular ellipsoid smooth not winged. *D. Don in Trans. Linn. Soc.* xvii. 520; *Griseb. Gentian.* 333, and in *DC. Prodr.* ix. 133. S. Hugelii, *Griseb. in DC. Prodr.* ix. 133.

ALPINE HIMALAYA, alt. 11–14,000 ft.; from Simla to Sikkim; *Wallich, Royle, J. D. H.*, &c.

Stem 6–24 in., hollow, $\frac{1}{8}$ in. thick. *Leaves* 3 by $\frac{3}{4}$ in., usually obtuse. *Pedicels* $\frac{1}{4}$–2 in., mostly long. *Sepals* $\frac{1}{4}$–$\frac{1}{2}$ in., narrowly oblong, obtuse acute or spathulate and apiculate. *Corolla-lobes* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., obtuse; the 2 glands fimbriate with hairs $\frac{1}{8}$ in. long or nearly naked. *Stigmas* of 2 sessile hemispheric plates. *Capsule* $\frac{1}{3}$ in. *Seeds* black-brown; testa close, reticulated.

29. **S. cœrulea,** *Royle Ill.* 278, t. 67, fig. 1; cauline leaves oblong sessile or the lower spathulate, pedicels short, corolla 5-merous, glands oblong small, seeds $\frac{1}{50}$ in. polyhedral smooth. *D. Don in Trans. Linn. Soc.* xvii. 521; *Griseb. in DC. Prodr.* ix. 132.

WESTERN HIMALAYA; alt. 5–9000 ft., *Royle*; Chumba, *Clarke.*

Stem 6–18 in., $\frac{1}{10}$ in. thick. *Leaves* nearly as of *S. cuneata.* *Cymes* forming a linear dense panicle, peduncles short, pedicels rarely longer than the flowers. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., narrowly lanceolate. *Corolla-lobes* $\frac{3}{4}$ by $\frac{1}{3}$ in., ovate, acute, blueish with green nerves, glands with small oblong slightly fimbriate scales. *Stigmas* sessile, hemispheric. *Capsule* $\frac{3}{4}$ by $\frac{1}{6}$ in., narrowly oblong. *Seeds* yellow-brown; testa close, reticulated.—Differs from *S. cuneata* in its corolla and seeds, and is excessively near *Pleurogyne rotata*; the difference is that in *Pleurogyne* the two scales near the base of each corolla-lobe are subconfluent, forming a nearly continuous hairy ring near the base of the corolla, without any definite depressions or viscous marks on the corolla-lobe above them; while in *Swertia cœrulea* there are two oblong minute depressions above the base of each corolla-lobe with an oblong scale fimbriated on its upper edge produced above the base of each depression so as partially to cover it.

VAR. *Wattii*; pedicels 1–2 in., sepals $\frac{3}{4}$ by $\frac{1}{6}$ in., corolla-lobes hardly longer than the sepals, scales at their base more developed.—Pangi, alt. 13,000 ft.; *Dr. Watt.*—This, except in the large calyx, closely resembles some forms of *S. perennis* (see *Engl. Bot.* t. 1441), which has seeds totally unlike *S. cœrulea*; but Dr. Watt's example being in young flower is not certainly determinable.

SUBGENUS III. **Poephila.** Perennial herbs with numerous short branches from the rootstock.

30. **S. multicaulis,** *Don Prodr.* 127; leaves narrowly spathulate-oblong, cymes very compound pedicels long, corolla 5-merous, a small pit at the base of each lobe with marginal fimbriæ. *Griseb. in DC. Prodr.* ix. 134; *Clarke in Journ. Linn. Soc.* xiv. 449.

ALPINE NEPAL and SIKKIM, alt. 14–17,000 ft., *Wallich, J. D. H.*, &c.

Branches 2–5 in., much divided. *Leaves* $1\frac{3}{4}$ by $\frac{1}{3}$ in., petiole $0–1\frac{1}{2}$ in. *Pedicels* 1–3 in., ultimately rigid, thickened upwards. *Sepals* $\frac{1}{4}–\frac{1}{3}$ in., narrowly oblong, acute or subobtuse. *Corolla-lobes* $\frac{1}{3}–\frac{1}{2}$ by $\frac{1}{6}–\frac{1}{5}$ in., obtuse; pit less than $\frac{1}{3}$ the breadth of the lobe, deep, without a scale but partially closed by the fimbriæ all round the margin. *Stigmas* sessile. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* $\frac{1}{24}$ in., ellipsoid, black; testa close, smooth, minutely reticulate.

13. HALENIA.

Annual or perennial erect herbs. *Leaves* opposite. *Cymes* axillary and forming a lax terminal panicle. *Calyx* sub-4-partite, segments lanceolate. *Corolla* campanulate, 4-fid more than half-way down, pits at the base of the lobes produced into a long spur (in the Indian species). *Stamens* 4, attached near the base of the corolla, filaments linear complanate; anthers ovate or oblong, versatile. *Ovary* 1-celled, placentæ broad; style short, cylindric, stigmas small oblong or linear. *Capsule* sessile, ovate, carpels separating nearly to the base. *Seeds* ellipsoid (fewer and larger than in most *Ophelias*) smooth, testa close yellow.—Species 25 (probably reducible to 15); Mts. of India, Central Asia and America.

1. **H. elliptica,** *D. Don in Trans. Linn. Soc.* xvii. 529; leaves elliptic subobtuse 5-nerved, spurs linear nearly as long as the petals. *Griseb. Gentian.* 326, and in *DC. Prodr.* ix. 129. Swertia centrostemma, *Wall. Cat.* 4385. S. peloria, *Griff. Itin. Notes,* 197.

TEMPERATE HIMALAYA, alt. 6–12,000 ft., from Kashmir to Bhotan, frequent.
Stem 1–24 in. Cauline *leaves* 1 by $\frac{1}{2}$ in. (in Don's type) to $2\frac{1}{2}$ by $\frac{3}{4}$ in. and acute; lower in large examples often petioled. *Sepals* $\frac{1}{5}$ in., usually acute. *Corolla* pale-blue; spurs $\frac{1}{6}$ to $\frac{1}{3}$ in., patent, tip often upcurved. *Style* hardly $\frac{1}{16}$ in. *Capsule* $\frac{1}{3}–\frac{1}{2}$ in. *Seeds* $\frac{1}{16}$ in. and upwards, with a concavity at the hilum.—The western small form with elliptic subobtuse leaves was D. Don's type; but large Sikkim examples with acute leaves appear to pass into *H. Sibirica* (Swertia corniculata, *Linn.*; *Pall. Fl. Ross.* ii. 99, t. 90, fig. 1), and, if this be admitted, the range of the species extends through Dahuria, N. China, and Siberia to N. America.

2. **H. Perrottetii,** *Griseb. in DC. Prodr.* ix. 129; leaves ovate or elliptic acute 5-nerved lower spathulate or petioled, spurs linear-oblong hardly half as long as the petals. *Wight Ill.* t. 157, and *Ic. t.* 1334.

NILGHERRIES, alt. 6–8000 ft.; plentiful.
Closely resembling *H. elliptica*. *Style* rather longer, stigmas sublinear. *Seeds* $\frac{1}{24}$ in., *i.e.* considerably smaller.

14. MENYANTHES, *Linn.*

Perennial herbs; rootstock creeping or floating. *Leaves* alternate, long-petioled, 3-foliolate in the Indian species. *Peduncles* long, scape-like; flowers white or blueish, subracemose; pedicels 1-bracteate or naked. *Sepals* 5, oblong-lanceolate. *Corolla* shortly funnel-shaped, 5-fid half way down; lobes fimbriate or crested within, induplicate valvate in bud. *Stamens* 5, on the corolla-tube, filaments linear; anthers sagittate, versatile. *Ovary* 1-celled, placentæ shortly intruded: style long, linear, stigmas 2 small. *Capsule* globose, shortly 2-valved from the apex, carpels splitting down the back. *Seeds* many, lenticular, shining, yellow, smooth.—Species 2, in the N. Temperate and Subarctic zones.

1. **M. trifoliata,** *Linn.*; *Griseb. Gentian.* 340, and in *DC. Prodr.* ix. 137; leaves 3-foliolate, leaflets elliptic or oblong obtuse entire or obscurely wavy. *Lamk. Ill.* t. 100, fig. 1; *Engl. Bot.* t. 495; *Boiss. Fl. Orient.* iv. 64; *Bentl. & Trim. Med. Pl.* t. 184.

WESTERN HIMALAYA; Kashmir; *Jacquemont, Falconer.*—DISTRIB. Europe, N. Asia, and N. America, the Caucasus, Amurland and Japan.

Stems covered by lax sheathing of petioles, the lower leafless. *Petioles* 3–8 in.; leaflets subsessile, 2 by 1 in. *Peduncle* 3–6 in.; raceme 1–6 in.; pedicels $\frac{1}{3}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{8}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. *Style* $\frac{1}{4}$ in. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., sometimes bifid nearly to the base. *Seeds* $\frac{1}{10}$ in.

15. LIMNANTHEMUM, *S. P. Gmel.*

Aquatic herbs. *Leaves* deeply cordate, entire or sinuate, alternate or subopposite. *Peduncles* clustered at the nodes; flowers white or yellow. *Sepals* 5–4, oblong. *Corolla* rotate, deeply 5–4-fid; tube often with glands opposite the lobes, sometimes hairy in the throat; lobes valvate in bud, ciliate, fimbriate or with an oblong longitudinal fold down their middle. *Stamens* 5–4, on the corolla-tube, filaments linear short; anthers hastate-oblong, versatile. *Ovary* 1-celled, placentæ not intruded; style short, stigma of 2–3 plates. *Capsule* ovoid or oblong, subindehiscent. *Seeds* numerous, orbicular, compressed, either slightly marginate, or nearly flat discoid; testa close, somewhat spongy finely reticulated, sometimes covered with papillose glands.—Species 14, in fresh water, throughout the Tropical and Temperate Zones.

1. **L. nymphæoides,** *Link Fl. Portug.* i. 344; leaves orbicular deeply cordate, umbels axillary, corolla yellow lobes crenulate-ciliate, capsule 1 in., seeds large discoid. *Griseb. Gentian.* 341, and in *DC. Prodr.* ix. 138; *Boiss. Fl. Orient.* iv. 65. Menyanthes nymphæoides, *Linn.*; *Engl. Bot.* t. 217; *Gaertn. Fruct.* ii. 157, t. 114. Villarsia nymphæoides, *Vent. Choix.* n. 9.

WESTERN HIMALAYA; Kashmir, alt. 6–9000 ft., *Falconer*, &c.—DISTRIB. From W. and Central Europe to China.

Stems long, floating, rooting at the nodes. *Leaves* subopposite, 1–2 in. diam.; petiole 1–2 in. *Pedicels* 1–4 in. *Calyx-lobes* 5, $\frac{1}{2}$ by $\frac{1}{8}$ in. *Corolla-lobes* $\frac{3}{4}$–1 in., without any longitudinal fold down the middle, sparingly ciliate. *Capsule* ellipsoid, acute, scarcely dehiscent. *Seeds* $\frac{1}{6}$ in. diam., lenticular, ellipsoid, winged.

2. **L. cristatum,** *Griseb. Gentian.* 342, and in *DC. Prodr.* ix. 139; leaves orbicular deeply cordate, pedicels densely fascicled at the nodes, corolla white yellow towards the base within lobes 5–6 entire with a longitudinal fold down the middle, capsule $\frac{1}{5}$ in., seeds numerous scabrous. *Wight Ill.* t. 157, *bis fig.* 4; *Dalz. & Gibs. Bomb. Fl.* 158; *Thwaites Enum.* 205. Menyanthes cristata, *Roxb. Cor. Pl.* ii. 3, t. 105, and *Fl. Ind.* ii. 28. Villarsia cristata, *Spreng. Syst.* i. 582; *Wall. Cat.* 4353; *Wight in Hook. Journ. Bot.* i. 65, t. 123; *Griff. Notul.* iv. 88, t. 386 A. V. indica, *Wall. Cat.* 4352 A. a.—*Rheede Hort. Mal.* xi. t. 29.

Throughout INDIA; very common.—DISTRIB. S. China.

Stems long, floating, rooting at the nodes. *Leaves* 1–3 in. diam.; petiole often 0–1$\frac{1}{2}$ in. *Pedicels* 0–2 in., numerous, unequal. *Calyx-lobes* $\frac{1}{5}$ by $\frac{1}{12}$ in. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in.; tube with a ring of white hairs round the throat. *Stigma* 2–4- (often 3-) ridged; placental lines 2–3. *Capsule* subglobose, 10–20-seeded. *Seeds* $\frac{1}{18}$ in., circular, very thick, lenticular, margins subacute, scabrous.

3. **L. indicum,** *Thwaites Enum.* 205; leaves orbicular deeply cordate, pedicels densely fascicled at the nodes, corolla white yellow towards the base within, lobes fimbriated densely papillose without a longitudinal fold down the middle, capsule $\frac{1}{4}$–$\frac{1}{3}$ in., seeds numerous smooth or nearly so. *Dalz. & Gibs. Bomb. Fl.* 158; *Benth. Fl. Austral.* iv. 378, *with all syn.* (*except Bot. Mag.* t. 658); *Boiss. Fl. Orient.* iv. 65; *Griseb. Gentian.* 343, and in *DC. Prodr.* ix. 139?. L. Kleinianum, *Griseb. Gentian.* 344, and in *DC. Prodr.* ix. 139; *Seem.*

Fl. Viti, t. 33. L. Wightianum, *Griseb. Gentian.* 344, and in *DC. Prodr.* ix. 139. L. calycinum, *Miq. Fl. Ind. Bat.* ii. 564. Menyanthes indica, *Linn. Sp. Pl.* 207; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 31. Villarsia indica, *Venten.*; *Wall. Cat.* 4352 A. g.; *Wight in Hook. Bot. Misc. Suppl.* t. 30. V. macrophylla, *Wight. in Hook. Bot. Misc.* iii. 96. V. eglandulosa, *Griff. Ic. Pl. As.* t. 385.—*Rheede Hort. Mal.* xi. t. 28; *Rumph. Herb. Amb.* vi. t. 72, fig. 3.

Throughout INDIA; very common.—DISTRIB. Cabul, Mascarene Islds., S.E. Asia, Malaya, Australia to Fiji Isles.

Stems long, floating, rooting at the nodes. *Leaves* 2–8 in. diam.; petiole 0 or short. *Pedicels* 0–5 in., numerous, unequal. *Calyx-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly lanceolate. *Corolla-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in. *Ovary* and stigmas nearly as in *L. cristatum.* *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in., subquadrate. *Seeds* $\frac{1}{20}$ in., thickly lenticular, smooth or minutely glandular-puberulous, never scabrous as in *L. cristatum.*—The descriptions of *L. cristatum* and *indicum* by Grisebach are so incorrect, that Bentham quotes Thwaites as the primary authority for this common species. *Bot. Mag.* t. 658, adduced here by Bentham, has yellow flowers, and looks more like *L. nymphæoides.*

4. **L. aurantiacum,** *Dalz. in Hook. Kew Journ.* ii. 136; leaves orbicular deeply cordate, pedicels few from each node, corolla yellow lobes fimbriated on the margin, capsule $\frac{1}{5}$ in., seeds smooth. *Dalz. & Gibs. Bomb. Fl.* 158. L. biflorum, *Thwaites Enum.* 205. Menyanthes biflora, *Moon. Cat. Pl. Ceyl.* 13.

W. DECCAN PENINSULA; from Bombay southwards. CEYLON, frequent.

Stems elongate, nodes not rooting. *Leaves* $1\frac{1}{2}$ in. diam.; petiole often 1–3 in. *Pedicels* commonly 2 from each node. *Calyx-lobes* 5, $\frac{1}{5}$ by $\frac{1}{10}$ in. *Corolla-lobes* $\frac{1}{3}$ in., sparingly fimbriate, without a longitudinal fold down the middle. *Capsule* subglobose, 10–15-seeded. *Seeds* $\frac{1}{20}$ in. diam.; nearly as of *L. indicum*; testa close, thick, minutely reticulate, not papillose.

5. **L. Forbesianum,** *Griseb. Gentian.* 345, and in *DC. Prodr.* ix. 139; leaves small orbicular deeply cordate, peduncles numerous equalling or exceeding the leaf, corolla white lobes 5 hairy within fimbriate on the margin, seeds globose obtusely carinate most minutely punctate not muricate.

CEYLON; *Macrae.*

Stems short; pedicels many fasciculate; corolla white (*Macrae*).—This appears to be a small form of *L. aurantiacum,* but Macrae has twice noted the corolla to be white. It is *Menyanthes campestris,* Macrae and Wight (in Herb.) partly; but half of Wight's sheet is *L. Moonii,* Thwaites.

6. **L. parvifolium,** *Griseb. in DC. Prodr.* ix. 141; leaves small radical spathulate-orbicular cauline deeply cordate, pedicels numerous fascicled, corolla white lobes 5–4 fimbriate, capsule oblong narrowed below, seeds minutely puberulous. *Dalz. & Gibs. Bomb. Fl.* 158. Villarsia parvifolia, *Wall. Cat.* 4351.

W. DECCAN PENINSULA, *Wight,* &c. CHITTAGONG, *H. f. & T.* Tavoy, *Wall.* CEYLON.

Stems apparently rooted on mud at the base, long, floating, not rooting at the nodes. Radical *leaves* 1 in. diam., cuneate at the base on the broad petiole; cauline leaves $\frac{1}{2}$–$\frac{3}{4}$, subsessile. *Pedicels* 3–10, $\frac{1}{4}$–$\frac{1}{2}$ in., at each node. *Calyx-lobes* $\frac{1}{10}$ in., oblong. *Corolla-lobes* $\frac{1}{6}$–$\frac{1}{5}$ in. *Capsule* $\frac{1}{6}$ by $\frac{1}{12}$ in.

VAR. *Moonii*; flowers 4-merous, capsule $\frac{1}{6}$ in. long and broad subglobose, seeds smooth, testa thick closely minutely reticulated. L. Moonii, *Thwaites Enum.* 205. Menyanthes campestris, *Moon. Cat. Pl. Ceyl.* 13.—Ceylon, *Thwaites, Kelaart.* Moulmein, *Griffith* (Kew Distrib. n. 187).

ORDER XCVIII. **POLEMONIACEÆ.** (By C. B. Clarke.)

Herbs, shrubs, or trees. *Leaves* exstipulate. *Flowers* showy, regular, hermaphrodite, 5-merous. *Calyx* inferior. *Corolla* gamopetalous, lobes twisted to the right. *Stamens* 5, on the corolla-tube, alternate with its lobes. *Ovary* superior, 3-celled; style simple, shortly 3-fid; ovules very many. *Capsule* septicidal, 3-valved. *Seeds* many, albuminous; embryo straight.—Species 150; in America, a very few in N. Asia and Europe.

1. **POLEMONIUM,** *Linn.*

Perennial herbs. *Leaves* alternate, pinnate. *Cymes* terminal, corymbose. *Flowers* blue. *Calyx* campanulate, lobed half-way down, scarcely ribbed. *Corolla* funnel-shaped, lobes patent obovate. *Stamens* attached near the base of the corolla; filaments declinate, hairy, appendaged at the base. *Ovary* and capsule ovoid. *Seeds* not or obscurely winged; testa, when wetted, becoming mucilaginous and breaking up elastically into spiral threads.—Species 8; from Europe, N. and Central Asia, N. America to Mexico and Chili.

P. cœruleum, *Linn.*; *Benth. in DC. Prodr.* ix. 317; stem erect leafy, leaflets lanceolate or ovate-lanceolate, flowers many corymbose, calyx-lobes ovate or lanceolate-oblong scarcely acute, corolla 2–3-times longer than the calyx. *Gaertn. Fruct.* i. 299, t. 62; *Lamk. Ill.* t. 106; *Wall. Cat.* 1471; *Syme Engl. Bot.* iii. t. 922; *Boiss. Fl. Orient.* iv. 83.

ALPINE WESTERN HIMALAYA, alt. 9–12,000 ft.; from Kashmir to Kumaon, frequent. —DISTRIB. Europe, N. and Central Asia, N. America.

Stems 1–4 ft., viscous hairy or glabrescent. *Leaves* 5 by 3 in., leaflets 1¼ by ¼ in. *Flowers* often clustered; corolla 1 in. diam. or more, a fine blue. *Capsule* ⅓ in., ellipsoid, much overtopped by the persistent calyx. *Seeds* $\frac{1}{10}$ in., oblong-ellipsoid, smooth, not winged (in the Indian plant).—The Himalayan, like the European plant, is tall with narrow leaflets.

ORDER XCIX. **HYDROPHYLLACEÆ.** (By C. B. Clarke.)

Differ from *Gentianaceæ* by the alternate leaves and imbricate corolla-lobes.

The single Indian genus, forming by itself the tribe *Hydroleæ*, is easily known from *Gentianaceæ* by its 2 styles distinct from the base with capitate stigmas.—Species 150, mainly American, 3 or 4 only in the Old World.

1. **HYDROLEA,** *Linn.*

Herbs. *Leaves* alternate, entire. *Flowers* blue, in short terminal racemes or cymes, regular, 5-merous. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, subrotate, lobes imbricate. *Stamens* 5, attached to the short corolla-tube, alternate with its lobes, filaments filiform often dilated at the base; anthers sagittate, oblong. *Ovary* completely 2-celled; styles 2, distinct, stigmas capitate; ovules very many. *Capsule* globose or ovoid, septicidal or irregularly 4-valved. *Seeds* minute.

H. zeylanica, *Vahl Symb.* ii. 46; annual, unarmed, leaves lanceolate, flowers racemed on short lateral branches, calyx-lobes lanceolate striate exceeding the capsule. *Lamk. Ill.* t. 184; *Wall. Cat.* 4398; *W. & A. in Hook. Comp.*

Bot. Mag. ii. 193, t. 26; *Wight Ill.* t. 167, and *Ic.* t. 601; *Choisy in DC. Prodr.* x. 180; *Dalz. & Gibs. Bomb. Fl.* 170. H. javanica, *Blume Bijd.* 725. Nama zeylanica, *Linn.*; *Roxb. Fl. Ind.* ii. 73. Nama, *Linn. Fl. Zeyl.* 49, t. 2. —*Rheede Hort. Mal.* x. 28.

Throughout INDIA, ascending to 4000 ft., in wet places; abundant in rice swamps. —DISTRIB. S.E. Asia, Malaya, and Australia; Tropical Africa and America.

Stems 3–18 in., procumbent, branched, with the inflorescence patently viscidly hairy, or (in the Ceylon form) nearly glabrous. *Leaves* 2 by ¼ in., narrowed at the base. *Racemes* 1–2 in.; bracts ¼–½ in., narrow; pedicels ⅛–⅓ in. *Sepals* ¼ in. *Corolla-segments* ⅓ in. *Filaments* dilated at the base, or nearly filiform. *Capsule* ⅙ in.

ORDER C. **BORAGINEÆ.** (By C. B. Clarke.)

Herbs, shrubs or trees, often hispid or scabrous. *Leaves* alternate, very rarely opposite, exstipulate, mostly entire. *Fowers* usually in dichotomous scorpioid cymes, rarely solitary and axillary. *Calyx* inferior, 5-, rarely 6–8-toothed or -lobed, usually persistent in fruit. *Corolla* gamopetalous, often with scales in the throat, rarely 4–6-lobed, imbricate (rarely twisted) in the bud. *Stamens* as many as the corolla-lobes, alternate with them, upon the corolla-tube. *Ovary* superior; cells 2, 2-ovuled, or 4–1-ovuled; style terminal or from between the ovary-lobes, long or short, stigma capitate or 2-lobed, rarely the style twice bifid; ovules suberect from the inner basal angle of the cell. *Fruit* drupaceous or dividing into 2–4 nutlets. *Seeds* erect or oblique, testa membranous, albumen fleshy copious sparing or 0; embryo straight or curved, radicle superior.—Species 1,200; throughout the world.

TRIBE I. **Cordieæ.** Trees or shrubs. *Style* terminal on the entire ovary, twice bipartite. *Drupe* 4–1-seeded; albumen 0; cotyledons plicate longitudinally.

Calyx-teeth very short, irregular . . . . 1. CORDIA.

TRIBE II. **Ehretieæ.** *Style* terminal on the entire ovary, simple, bipartite, or styles 2. *Drupe* with 2 2-celled, or 4 1-celled pyrenes; or of 4–1 nuts.

Trees or shrubs. Style 2-fid . . . . 2. EHRETIA.
Prostrate herb. Styles 2 . . . . 3. COLDENIA.
Virgate shrub. Style 1, stigma capitate . . . . 4. RHABDIA.

TRIBE III. **Heliotropieæ.** *Style* terminal on the entire ovary, depressed-conic at the apex, or with a horizontal ring below the stigmas. *Fruit* as of *Ehretieæ*.

Shrubs, often scandent. Style short, shortly 2-lobed . . . 5. TOURNEFORTIA.
Herbs. Style dilated at the apex or above the base . . . 6. HELIOTROPIUM.

TRIBE IV. **Borageæ.** Herbs. *Style* simple or bifid, rising from between the ovary lobes (except in *Trichodesma*). *Nutlets* 4, rarely 3–1 by suppression (2 in *Rochelia*); albumen 0.

SUBTRIBE I. CYNOGLOSSEÆ. *Nutlets* attached to a convex or conical carpophore, scar continued to the apex of the nutlets which are often depressed, produced, or saccate at the base.

* *Fruiting calyx enlarged enclosing the nutlets.*

Anthers conically connivent, lanceolate, subexsert . . . . 7. TRICHODESMA.

** *Nutlets depressed, their bases produced downwards.*

Stamens included. Nutlets obovoid, scar punctiform . . .	8. ACTINOCARYA.
Stamens included. Margins of nutlets reflexed over their backs	9. OMPHALODES.
Stamens included. Nutlets obovoid, glochidiate	10. CYNOGLOSSUM.
Stamens exserted; anthers large, linear-oblong	11. LINDELOFIA.
Stamens exserted; anthers small, shortly oblong	12. SOLENANTHUS.

*** *Nutlets connate, forming a pyramidal fruit, margined, hardly produced downwards.*

Racemes ebracteate. Margin of the nutlets glochidiate, often reflexed	13. PARACARYUM.
Racemes bracteate. Margin of the nutlets glochidiate, scarcely reflexed	14. ECHINOSPERMUM.

SUBTRIBE II. ERITRICHIEÆ. *Nutlets* attached to a convex or conical carpophore, scar in the middle or lower half of the nutlets which are not depressed at the base, but are produced at the apex above the scar, free round the base of the style.

* *Scar in the basal half of the nutlet.*

Racemes ebracteate. Nutlets 4	15. ERITRICHIUM.
Racemes bracteate. Nutlets 2, 1-seeded	16. ROCHELIA.

** *Scar in the middle of the inner face of the nutlets.*

† *Scar small, without a prominent thickened incurved margin.*

Flowers axillary, subsessile. Fruiting calyx enlarged . .	17. ASPERUGO.
Almost stemless. Fruiting calyx not enlarged	18. MICROULA.

†† *Scar depressed, with a thickened incurved margin.*

Flowers axillary, pedicelled	19. BOTHRIOSPERMUM.
Flowers axillary, subsessile	20. GASTROCOTYLE.

SUBTRIBE III. ANCHUSEÆ. *Nutlets* on a flat or nearly flat receptacle; scar basal, prominent, hollowed out, with a prominent thickened margin.

* *Corolla-throat closed by 5 scales.*

Corolla-tube straight	21. ANCHUSA.
Corolla-tube curved	22. LYCOPSIS

** *Corolla-throat naked or hairy within, but without scales.*

Racemes dense. Calyx large	23. NONNEA

SUBTRIBE IV. LITHOSPERMEÆ. *Nutlets* on a flat or nearly flat receptacle scar basal, but little hollowed out, without a prominent margin.

* *Racemes ebracteate. Corolla-lobes distinct.*

Corolla-tube cylindric. Anthers included	24. MERTENSIA.
Corolla-tube cylindric. Anthers exserted	25. MOLTKIA.
Corolla-tube short. Nutlets tetrahedral	26. TRIGONOTIS.
Corolla-tube short. Nutlets ovoid-oblong	27. MYOSOTIS.

** *Racemes bracteate. Corolla-lobes distinct.*

Corolla-throat naked or with small scales	28. LITHOSPERMUM.
Corolla-throat densely filled with hairs	29. SERICOSTOMA.

Hispid spreading herbs. Corolla yellow, tube elongate . . 30. ARNEBIA.
Suberect herbs. Corolla purple, tube elongate . . . . . . 31. MACROTOMIA.

*** *Corolla-lobes reduced to minute teeth.*

Anthers lanceolate, connivent in a cone . . . . 32. ONOSMA.

1. CORDIA, *Linn.*

Trees or shrubs, sometimes subscandent. *Leaves* alternate, rarely subopposite, petioled. *Flowers* in dichotomous corymbs or clusters, ebracteate, polygamous, hermaphrodite corymbs much fewer-flowered than the male. *Calyx* tubular or campanulate, teeth very short often irregular, in fruit accrescent. *Corolla* funnel-shaped; lobes 4–8, patent or recurved, white or orange. *Stamens* 4–8, filaments often hairy at the base; anthers shortly exserted. *Ovary* 4-celled, glabrous; style terminal, long, bipartite, branches again bipartite linear or subspathulate; cells 1-ovuled. *Drupe* ovoid or ellipsoid, putamen bony, cells 1–4, usually 1 fertile. *Seeds* exalbuminous.—Species 180, all tropical.

SECT. I. **Myxa.** *Corolla* small, white; tube hardly so long as the calyx. *Stamens* usually 4–5.

* *Adult leaves glabrous or subvillous beneath, not tomentose* (except in *C. obliqua*, Willd. var. *Wallichii*).

† *Leaves 3-* (*or 3–5-*) *nerved at the base, lateral primary nerves few.*

1. **C. Myxa,** *Linn.*; *DC. Prodr.* ix. 479; branchlets glabrous, leaves ovate or oblong sub-3-nerved glabrous above, corymbs lax many-fld., calyx glabrous or minutely pubescent without lobes hairy within, berry $\frac{3}{4}$ in. ovoid subacute 1-seeded. *Delile Fl. Æg.* t. 19, fig. 1; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 332; *Wall. Cat.* 889; *Wight Ill.* t. 169; *Hayne Arzn. Gewach.* ix. t. 33; *Dalz. & Gibs. Bomb. Fl.* 173; *Benth. Fl. Austral.* iv. 386 (*with syn.*); *Bedd. For. Man.* 165, and *Fl. Sylv.* t. 245, fig. A; *Brand. For. Fl.* 336, *partly*; *Kurz For. Fl.* ii. 208; *Boiss. Fl. Orient.* iv. 124. C. Myxa, var. β *minor only*, *Thwaites Enum.* 214. C. indica, *Lamk. Dict.* vii. 49; *DC. Prodr.* ix. 500. C. officinalis *and* africana, *Lamk. Ill.* ii. 420, and *Ill.* t. 96, fig. 3. C. Sebestena, *Forsk. Fl. Æg. Arab.* lxiii. C. paniculata, *Roth Nov. Sp.* 124; *DC. Prodr.* ix. 482. Sebestena officinalis, *Gaertn. Fruct.* i. 364, t. 76. Ehretia glabra, *Roth Nov. Sp.* 127; *DC. Prodr.* ix. 510, *ex descr.* Beurreria glabra, *G. Don Gen. Syst.* iv. 390.—*Rheede Hort. Mal.* iv. t. 37.

Throughout INDIA and CEYLON, alt. 0–3000 ft.; common wild, and often planted. DISTRIB.—From Egypt to Cochin-China and Tropical Australia; but often cultivated.

A crooked tree, 40 ft., or a shrub. *Leaves* alternate, 1–5 in. diam., very variable in form and size, subentire, repand-crenate or sublobate, never acuminate; above glabrous or very obscurely scabrous without white discs or hairs, beneath scabrous often hairy or subvillous when young; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. *Flowers* ♂ and ☿, often on the same tree, mostly 5-merous. *Corymbs* 2–8 in., male larger laxer, terminal and on short lateral branches (*C. reflexa* sp., Wight mss.), glabrous or (when young) villous or pubescent. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. at flower-time, soon much accrescent, tubular-campanulate, lobes very short. *Corolla-lobes* $\frac{1}{10}$–$\frac{1}{8}$ in., tube hairy within. *Stigmas* with long linear lobes. *Berry* yellow or pinkish, glassy, nearly always 1-seeded; fruiting calyx $\frac{3}{4}$ in. diam., wide-funnel-shaped, glabrescent, more or less distinctly striated longitudinally.—Sebesten.

VAR. *brunnea*, Kurz For. Fl. 208; leaves large, young shoots fulvous-pubescent, young calyx pubescent or subtomentose, berry 1 in. ovoid subacute 1-seeded. C. latifolia, *Wall. Cat.* 893, *not of Roxb.*—Bengal, Assam, Khasia, Burma, alt. 0–2000

ft.; frequent. Distrib. Ava, Malacca.—Leaves mostly broad-elliptic or obovate-oblong, glabrous above, never tomentose beneath; corymbs (at least of ♂) very dense; corolla exactly as of *C. Myxa.*—This is the plant united by modern authors with the typical glabrous form of *C. obliqua*, Willd., which has a considerably larger corolla.

Var. *domestica*; innovations fulvous-tomentose, leaves small young minutely pubescent above closely grey tomentose beneath, corymbs small grey tomentose. C. domestica, *Roth Nov. Sp.* 123.—Deccan (?); *Herb.* Wight.—*Leaves* ½–1½ in., repand-crenate, mature nearly glabrous. *Flowers* as of *C. Myxa. Berries* (when nearly ripe) rostrate-acuminate, very unlike those of *C. Myxa.* This may be a distinct species, and possibly more nearly allied to *C. fulvosa*, Wight.

2. **C. obliqua,** *Willd. Sp. Pl.* i. 1072; innovations fulvous-villous, leaves ovate or orbicular sub-3-nerved young tomentose beneath adult glabrous, corymbs divaricate dichotomous glabrous, calyx glabrous without or scarcely villous on the margin, berry 1 in. ovoid subacute 1-seeded. *DC. Prodr.* ix. 479. C. latifolia, *Roxb. Fl. Ind. ed Carey & Wall.* ii. 330; *Dalz. & Gibs. Bomb. Fl.* 173, *not of Wall.* C. Myxa, *Thwaites Enum.* 213, *not of Linn.*; *Brand. For. Fl.* 336, *partly.*

Western India, from the Punjab and Hindostan to Ceylon, frequent. Nicobars.

A tree closely resembling *C. Myxa. Calyx* ⅕–¼ in. (at flower-time); tube campanulate; lobes distinct, densely villous within. *Corolla-lobes* ⅕–¼ in.

Var. *Wallichii*; adult leaves densely stellately fulvous- or white-tomentose beneath, calyx glabrescent without below, teeth densely fulvous-villous. C. Wallichii, *G. Don Gen. Syst.* iv. 379; *DC. Prodr.* ix. 479; *Dalz. & Gibs. Bomb. Fl.* 174; *Bedd. Fl. Sylv.* t. 245. C. tomentosa, *Wall. in Roxb. Fl. Ind. ed Carey & Wall.* ii. 329. C. obliqua, *Wight Ic.* t. 1378. C. grandis, *Wall. Cat.* 892 B.—W. India from Lahore to Kurg.—This is *C. obliqua*, var. β of all the old collectors, who have mixed it with *C. obliqua* type. The two are undoubtedly one; they differ in hairs *only*, and intermediately hairy examples occur.

3. **C. monoica,** *Roxb. Cor. Pl.* i. 43, t. 58, and *Fl. Ind. ed. Carey & Wall.* ii. 334; innovations fulvous-tomentose, leaves ovate 3-nerved scabrous with white discs above mature glabrescent or somewhat villous beneath, corymbs small tomentose, berry ⅔ in. ovoid scarcely acute. *DC. Prodr.* ix. 479; *Bedd. For. Man.* 166. C. polygama, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 237; *Wall. Cat.* 891; *DC. Prodr.* ix. 480; *Bedd. For. Man.* 166; *Kurz For. Fl.* ii. 207. C. diversa, *Thwaites Enum.* 214; *Bedd. For. Man.* 166.—Cordia sp. n. 16, *Herb. Ind. Or. H.f. & T.*

Deccan Peninsula from Orissa and the Central Provinces southwards to Ceylon; alt. 2–5000 ft., common.

A small tree. *Leaves* 1–3 in., obtuse or subacute, subentire or sharply crenate. *Corymbs* 1–2 in. diam., dense, monoicous or polygamous; ♂ usually 4-androus, ♀ 5-androus. *Calyx-tube* ⅕ in, tomentose or pubescent; teeth small, villous. *Corolla-lobes* ⅕ in., narrow. *Drupe* yellow; stone 4-celled, drilled at the apex, 3 cells barren, one 1-seeded.—The authentic specimens of *C. polygama* are identical with *C. monoica*; Wight has called the examples with subentire leaves *C. monoica*, and those with strongly crenate leaves *C. polygama.*

4. **C. grandis,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 335; leaves large ovate 3–5-nerved scabrous above mature glabrous or scarcely villous beneath, corymbs large dense, flowers small pubescent or scarcely tomentose, berry at most ½ in. ellipsoid very obtuse. *Wall. Cat.* 892; *DC. Prodr.* ix. 481; *Kurz For. Fl.* ii. 208. C. cordifolia, *Wall. Cat.* 894.

ASSAM, *Griffith*, &c. CHITTAGONG; *H. f. & T.*, &c. PEGU; *Kurz.*—DISTRIB. Ava.

A large tree. *Leaves* 3–6 in., acute or obtuse, scabrid with very small rough points, base 3–5-nerved; petiole 1–2½ in. *Corymbs* terminal, female many-flowered, male dense. *Calyx* at flower-time scarcely ⅙ in., tubular-campanulate. *Corolla-lobes* 4, ⅛–⅙ in. *Stamens* 4. *Berry* usually ⅓ by ⅕ in., 1–2-seeded; fruiting-calyx scarcely ⅓ in wide.

†† *Leaves feather-nerved not (or obscurely) 3-nerved at the base.*

5. **C. Rothii,** *Roem. & Sch. Syst.* iv. 798; leaves subopposite oblong base attenuate feather-nerved mature scabrous glabrescent, cymes small pubescent or subtomentose, berry ⅓ in. ellipsoid acute. *Wight Ic.* t. 1379; *DC. Prodr.* ix. 480; *Dalz. & Gibs. Bomb. Fl.* 174; *Bedd. For. Man.* 166; *Brand. For. Fl.* 338. C angustifolia, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 338, *not of Roem. & Sch.* C. reticulata, *Roth Nov. Sp.* 124; *Wall. Cat.* 895; *not of Vahl.* C. subopposita, *DC. Prodr.* ix. 480.

W. INDIA, from the Punjab, Hurdwar, and Scinde to Malabar, frequent.—DISTRIB. Arabia, Abyssinia.

A tree, attaining 30 feet. *Leaves* 4 by 1¼ in., usually obtuse, entire or undulate; petiole ¾ in. *Corymbs* 1–3 in. *Calyx* at flower time ⅕ in., minutely pubescent. *Corolla-lobes* usually 4, ⅛ in. *Berry* usually 1-seeded.

6. **C. Perrottetii,** *Wight Ic.* t. 1381, *not of A. DC.*; leaves obovate-oblong feather-nerved scabrous pubescent, corymbs small tomentose, berry ½ in. ellipsoid acuminate. *Bedd. For. Man.* 166 *partly?*

S. DECCAN PENINSULA; Bellary, Coimbatore, &c., *Wight.*

A small tree. *Leaves* 1–2 in., somewhat clustered, scarcely subopposite, obtuse, entire or crenate; petiole ⅛ in. *Corymbs* 1–2 in. *Calyx* at flower time ⅛ in., tomentose, tubular-campanulate, soon glabrescent. *Corolla-lobes* mostly 4, ⅙–⅕ in.—Cordia Perrottetii, *A. DC. Prodr.* ix. 482 (Perrottet's Pondicherry example) is *Premna tomentosa*, Willd.; Beddome's description l. c. appears compounded of this and Wight's.

7. **C. oblongifolia,** *Thwaites Enum.* 214; leaves elliptic acute or lanceolate feather-nerved mature glabrous, corymbs terminal soon glabrous, berry 1 by ¾ in. ellipsoid shortly acute. *Bedd. For. Man.* 166. ? C Leschenaultii, *DC. Prodr.* ix. 482.

CEYLON; Central Province up to 2000 ft., *Thwaites.*

Subscandent, *Thwaites. Leaves* alternate, 4 by 2 in. elliptic, or 4 by 1 in. lanceolate, base cuneate or rounded, subentire, secondary nerves conspicuous minutely reticulated; petiole 1 in. *Corymbs* 2–4 in., flowers in close clusters. *Calyx* at flower time ⅓ in., narrowly funnel-shaped, nearly glabrous without. *Corolla-lobes* 5–7, ⅕ in.—Of C. Leschenaultii no authentic example has been seen; the old specimen in the British Museum so named is *C. oblongifolia.* These plants only differ from *C. Myxa* in the leaves being obscurely 3-nerved at the base with more numerous lateral nerves.

8. **C. Roxburghii,** *Clarke*; minutely scabrous-pilose, leaves oblong-lanceolate copiously feather-nerved, corymb small, calyx widely funnel-shaped teeth triangular distinct.

CEYLON; *Herb. Roxburgh.*

Branches terete, minutely scabrous-pilose. *Leaves* alternate, 3½ by 1 in., acute at both ends, coriaceous, subentire, nerves 10–15 pair; petiole ¼ in. *Corymb* 1½ in. diam., minutely scabrous-pilose; flowers few, sessile in small clusters. *Calyx* at flower-time ⅕ in., minutely scabrous-pilose; teeth 5 or 6, $\frac{1}{12}$ in., minutely scabrous-pilose within. *Corolla* glabrous within, lobes ⅛ in., elliptic. *Style* long, divided into

4 spathulate branches. *Stamens 5*, glabrous; anthers large, oblong.—A very distinct species; but possibly not an indigenous plant of Ceylon.

9. **C. Griffithii,** *Clarke*; leaves alternate lanceolate and ovate-lanceolate glabrous feather-nerved, male corymbs large terminal lax nearly glabrous.

MALACCA; *Griffith.*

Branchlets terete, glabrous, curved; innovations fulvous-tomentose. *Leaves* 3½ by 1⅔ in., or the uppermost narrow-lanceolate, acuminate to an obtuse apex, cuneate at the base, subentire, texture thin, secondary nerves finely reticulate; petiole ¾ in. *Calyx* at flower-time ¼ in., funnel-shaped, nearly glabrous. *Corolla-lobes* 5, ⅕ in., elliptic.—Appears closely allied to *C. oblongifolia.* A male plant collected at Malacca by Maingay (Kew Distrib. n. 1162) is perhaps the same, but has the primary nerves of the leaves more numerous.

** *Adult leaves tomentose beneath.*

10. **C. fragrantissima,** *Kurz For. Fl.* ii. 207; leaves alternate large ovate 3-nerved mature scabrous above grey-tomentose beneath, corymbs large terminal soon glabrescent, berry ⅓ in. ellipsoid obtuse. C. rotundifolia, *Heyne in Herb. Rottler.*

KHASIA MTS.; *Griffith* (Kew Distrib. n. 5999). E. BENGAL, at Mymensing; CHITTAGONG, MARTABAN, and TENASSERIM; *Kurz.*

This closely resembles *C. grandis*, Wall. in its area of distribution, inflorescence, 4-merous flowers, and berries: differing only in the adult leaves being densely-stellately villous beneath. Kurz says "ovary with a sessile stigma," whence, it is presumed, he had only male flowers.

11. **C. vestita,** *H. f. & T. in Journ. Linn. Soc.* ii. 128; innovations fulvous-woolly, leaves ovate or oblong acuminate sub-3-nerved harshly coriaceous tomentum beneath deciduous, flowers cymose-paniculate, berry ¾ in. ellipsoid acute. *Brand. For. Fl.* 338. C. incana, *Royle Ill.* p. 306, *name only.* Gynaion vestitum, *A. DC. Prodr.* ix. 468.

SUBTROPICAL WESTERN HIMALAYA, alt. 1–4000 ft.; frequent from the Jhelum to Oude, *Edgeworth*, &c.

A tree, attaining 30 feet. *Leaves* 4 in., sometimes ovate from a rounded base, sometimes cuneate-oblong from a narrow base, entire crenate or lobed, densely tomentose beneath at least till nearly mature, at length scabrous above often with white dots; petiole 1 in. *Corymbs* dense, tomentose, and woolly. *Calyx* ½ in., tubular-clavate, prominently ribbed upwards, or, in other examples, much smaller, scarcely clavate, hardly ribbed. *Corolla-lobes* ⅓ in., obovate, or smaller elliptic. *Calyx* in fruit ¾–1 in. diam., saucer-shaped; or, in Aitcheson's Punjab examples, ¾ by ⅔ in., elongate campanulate, strongly ribbed.

12. **C. Macleodii,** *H. f. & T. in. Journ. Linn. Soc.* ii. 128; very softly densely tomentose, leaves cordate-ovate obtuse 3–5-nerved permanently tomentose beneath, corymbs short tomentose, berry ¾ in. ovoid acute. *Brand. For. Fl.* 337, t. 41. Hemigymnia Macleodii, *Griff. in Calc. Journ. Nat. Hist.* iii. 363; *Schauer in DC. Prodr.* xi. 697.

CENTRAL INDIA, CONCAN and BELGAUM; *Stocks, Dalzell*, &c.

A tree, attaining 40 feet. *Leaves* alternate, scarcely subopposite; mature 5 in. diam., impressed rugose above, densely tomentose beneath; petiole 1–2 in. *Calyx* ½ in., tubular-clavate, densely tomentose, ribbed upwards; or much smaller, not (or obscurely) ribbed. *Corolla-lobes* ⅓ in., oblong, or much shorter. *Fruit* acutely conical till nearly ripe, calyx broadly funnel-shaped or subcampanulate.—The specimen on which Griffith founded the species, is leafy and in flower, the calyx then

about $\frac{1}{4}$ in.; most of the examples are leafless when in flower, often with much larger calyx.

13. **C. fulvosa,** *Wight Ic.* t. 1380; leaves ovate obtuse or acute tomentum beneath hard, corymbs closely tomentose calyx soon glabrescent, berry $\frac{3}{4}$–1 in. ovoid acute. *Bedd. For. Man.* 166. C. polygama, *Wall. Cat.* 892, *partly.*—Cordia sp. n. 13, *Herb. Ind. Or. H. f. & T.*

W. Deccan Peninsula; Concan and Belgaum, *Law, Stocks, Ritchie.*

Leaves with hard, not woolly tomentum, becoming scabrous or subglabrate in age, very variable in size, obtuse or more often acute, crenately lobed or entire, obscurely 3-nerved.—Except in its much less tomentose corymb and leaves, this is undistinguishable from *C. Macleodii*; it may be *only* a more tomentose form of *C. monoica*, as Wallich esteemed it.

Var. *evolutior*; less tomentose, leaves 8 by 4 in., corymb large, calyx at flower-time glabrescent.—Bombay; *Dalzell.*—A very doubtful plant; it forms part of Cordia n. 13, *Herb. Ind. Or. H. f. & T.* and appears really to belong here, but it is exceedingly unlike Wight's picture of *C. fulvosa.*

Sect. II. **Sebesten.** *Corolla* larger, tube exceeding the calyx. *Stamens* 6–8.

14. **C. octandra,** *A. DC. Prodr.* ix. 477; leaves ovate acuminate crenate-subserrate 3-nerved nearly glabrous, calyx cylindric obscurely tomentose without, corolla white tube slightly longer than the calyx, stamens usually 8. *Bedd. For. Man.* 166. C. serrata, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 333; *Wall. Cat.* 890; *Wight Ic.* t. 469, *not of Juss.*

Travancore; *Roxburgh.*

Arboreous. *Leaves* alternate, 6 by 3 in., rounded or rhomboid at the base; petiole 1–2 in. *Corymbs* lateral, peduncled, 2–4 in., minutely rusty; flowers subsessile in small clusters. *Calyx-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{10}$ in., triangular, hairy within. *Corolla-lobes* 7–9, $\frac{1}{3}$ in. *Filaments* hairy; anthers ovate, small.—Described from the Calcutta Botanic Garden examples; no wild specimen known.

15. **C. subcordata,** *Lamk. Ill.* ii. 421; leaves large ovate acute obscurely 3-nerved nearly glabrous without, corolla large orange or reddish tube exceeding the calyx, stamens 6. *Wall. Cat.* 9063; *DC. Prodr.* ix. 477; *Seem. Fl. Viti*, t. 34; *Benth. Fl. Austral.* iv. 385, *with syn.*; *Kurz For. Fl.* ii. 209. C. orientalis, *Br. Prodr.* 498. C. campanulata, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 336. C. Rumphii, *Blume Bijd.* 843. C. hexandra, *Roem. & Sch. Syst.* iv. 799.—*Rumph. Herb. Amb.* ii. t. 75.

Andamans and S. Malay Peninsula. In Bengal and various parts of India often planted.—Distrib. S.E. Asia to Australia and the Sandwich Isles. Widely cultivated.

A small tree. *Leaves* 3–6 in., base rounded or subcordate; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. *Corymbs* lateral and few-fld., nearly glabrous; flowers usually 6-merous. *Calyx* $\frac{1}{2}$ in.; teeth short, triangular, villous within. *Corolla-tube* $\frac{3}{4}$ in, lobes $\frac{3}{8}$ in. Branches of the *stigmas* linear-spathulate. *Fruit* 1 in., ellipsoid, acute, usually 1-seeded. *Seed* grossly muricated, subspinose.

EXCLUDED SPECIES.

Cordia Finlaysoniana, *Wall. Cat.* 7010; without locality attached, was probably collected in Cochin-China.

Cordia sp., *Wall. Cat.* 9064, is *Mappia oblonga*, Miers, var. *elliptica* (v. i. p. 589).

II. **EHRETIA,** *Linn.*

Shrubs or trees, scabrous or glabrous. *Leaves* alternate. *Corymbs* or panicles axillary or terminal, rarely peduncles axillary 1-flowered; flowers small, white. *Calyx* sub-5-partite. *Corolla-tube* short or cylindric; lobes 5, imbricated in the bud, patent or reflexed. *Stamens* 5, on the corolla-tube; anthers ovate or oblong, exsert, rarely included. *Ovary* 2-celled, cells 2-ovulate; style terminal, cylindric bifid or bipartite, stigmas small capitate. *Drupe* small, subglobose, 4- (or by suppression 3-1-) seeded; pyrene one 4-celled, or two 2-celled, or four 1-celled; 3-1 pyrenes or cells not rarely suppressed. *Seeds* straight, testa thin, albumen scanty.—Species 50, all tropical; principally in the Old World.

SECT. 1. **Euehretia.** *Style* single, bifid.

* *Leaves serrate.*

1. **E. acuminata,** *Br. Prodr.* 497; leaves elliptic-oblong acuminate serrate glabrous beneath, panicles terminal dense compound, calyx-lobes $\frac{1}{20}$ in. obtuse. *DC. Prodr.* ix. 503; *Benth. Fl. Austral.* iv. 387. E. serrata, *Roxb. Hort. Beng.* 17, and in *Fl. Ind. ed. Carey & Wall.* ii. 340; *Wall. Cat.* 898; *Bot. Reg.* t. 1097; *Wight Ill.* t. 170; *DC. Prodr.* ix. 503; *Griff. Ic. Pl. As.* t. 459; *Brand. For. Fl.* 339; *Kurz. For. Fl.* ii. 210. E. pyrifolia, *Don Prodr.* 102. E. ovalifolia, *Hassk. Cat. Hort. Bog.* 137, *not of Wight.* Cordia thyrsiflora, *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 26.

SUBTROPICAL HIMALAYA and adjacent plains, ascending to 5000 ft., from Ghurwal to Bhotan, common. KHASIA MTS. to PEGU.—DISTRIB. Ava, Australia, Japan.

A tree, attaining 40 feet. *Leaves* 3-4 in., minutely bristly or glabrous above; petiole $\frac{1}{2}$ in. *Panicles* 2-6 in., minutely bristly or glabrescent, crowded with flowers. *Corolla-tube* very short; lobes $\frac{1}{8}$ in., reflexed. *Anthers* exsert. *Style* bifid for less than half its length, branches linear, stigmas minutely capitate. *Drupe* $\frac{1}{8}$-$\frac{1}{6}$ in. diam., short-ellipsoid, obtuse, not ribbed nor lobed; pyrenes 2, without any hollow between them, each 2-celled, cells 1-seeded.

2. **E. macrophylla,** *Wall. Cat.* 901, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 343; leaves large broadly elliptic acute serrate bristly above softly hairy beneath, panicle terminal compound bristly, calyx-lobes (in young fruit) $\frac{1}{6}$ in. oblong-lanceolate. *DC. Prodr.* ix. 503.

NEPAL; Chundaghiri, *Wallich.*

A tree. *Leaves* $7\frac{1}{2}$ by 4 in., rhomboid or rounded at the base; petiole 1 in. *Panicle* 2-3 in., sparsely fulvous hirsute. Young *drupe* $\frac{1}{4}$ in. (but Wallich notes the drupe size of a small gooseberry); pyrenes 2, each 2-celled.—Flowers unknown to Wallich. E. Dicksoni, *Hance in Ann. Sc. Nat.* 4, xviii. 224, from the interior of S. China, is probably the same species (the leaves in Hance's examples are broadly elliptic subcordate, not oblong as in the description); calyx softly hairy, tube $\frac{1}{12}$ in., lobes $\frac{1}{8}$ in. oblong; corolla-tube $\frac{1}{4}$ in., pubescent without, lobes $\frac{1}{5}$ in. ovate reflexed; anthers long exsert; style single long sparsely hairy, lobes 2 short oblong glabrous; berry as of *C. macrophylla*, $\frac{2}{3}$ in. diam.

** *Leaves quite entire.*

3. **E. lævis,** *Roxb. Cor. Pl.* 42, t. 55, and *Fl. Ind. ed. Carey & Wall.* ii. 341; leaves ovate shortly acuminate undulate base unequally cuneate glabrous, nerves 5-6 pair irregular tufted in the axils, corymbs mostly subaxillary repeatedly dichotomous branches recurved in fruit, calyx-lobes small pubescent, style shortly 2-branched. *Don Prodr.* 102; *Wall. Cat.* 899; *DC. Prodr.* ix.

505; *Wight Ic.* t. 1382; *Dalz. & Gibs. Bomb. Fl.* 170; *Bedd. Fl. Sylv.* t. 246; *Kurz For. Fl.* ii. 210; *Brand. For. Fl.* 340, t. 42. E. punctata, *Roth Nov. Sp.* 126. E. affinis, *Wall. Cat.* 900. E. dichotoma, *Rottl. in Wall. Cat.* 904, *probably of Blume also.* Beurreria lævis and punctata, *G. Don Gen. Syst.* iv. 390.

Throughout INDIA in tropical and subtropical regions, common.—DISTRIB. From Persia to China, Australia and Polynesia, the allied Tropical African species are perhaps only geographical forms.

A tree 30–40 feet, or a shrub; branchlets glabrous, or rusty-pubescent, or sparsely laxly hirsute. *Leaves* 5 by $2\frac{1}{4}$ in., unsymmetric, rather thin in texture, young glabrous softly hairy or densely tomentose, mature glabrescent; petiole $\frac{2}{3}$ in. *Corymbs* 3 in. lax, glabrous or usually pubescent or rusty, ultimate branches long recurved with sessile fruits. *Calyx-lobes* $\frac{1}{20}$ in., oblong, in fruit ovate. *Corolla-tube* $\frac{1}{10}$ in,, lobes $\frac{1}{8}$ in. spreading. *Anthers* exsert. *Drupe* (when perfecting 4 seeds) $\frac{1}{5}$ in. diam., depressed globose, when dry distinctly 4-ribbed, pyrenes 4 each 1-seeded; on one corymb are usually seen drupes perfecting 1, 2, 3, or 4 seeds.—All authors previous to Brandis have kept this species distinct, describing it as absolutely glabrous; it is however nearly always manifestly hairy, and the indumentum is rusty, pubescent, ciliate, hirsute or tomentose at least in the innovations.

VAR. *floribunda*, Brand. For. Fl. 340; innovations hairy or glabrous, corymbs large axillary or collected towards the ends of the branches often forming quasi-panicles 6 in. diam. E. floribunda, *Benth. in Royle Ill.* 306; *DC. Prodr.* ix. 507; *Boiss. Fl. Orient.* iv. 124. E. Cutranga, *Ham. in Wall. Cat.* 7012.—Punjab to Behar. Distrib. Cabul.

VAR. *pubescens*; branchlets hairy, mature leaves softly hairy beneath or on both surfaces. E. pubescens, *Benth. in Royle Ill.* 306; *DC. Prodr.* ix. 597.—Throughout India.

VAR. *timorensis*; glabrous or the innovations and corymbs rusty-pubescent, leaves broadly oblong or somewhat obovate acuminate, corymbs axillary and terminal. E. timorensis, *Dcne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 395; *DC. Prodr.* ix. 505. E. philippensis, *A. DC. Prodr.* ix. 504. E. lævis, *type Benth. Fl. Austral.* iv. 389.—Malay Peninsula. Distrib. Malaya, Australia.—*Leaves* often 6 in., usually larger and more acuminate than in the Indian *E. lævis*, also drying very black and usually symmetric or nearly so. As to the fruit, in *E. lævis* type it is often sub-2-pyrenous, the pyrenes only separating into 4 ultimately or with difficulty.

VAR. *canarensis*; glabrous or nearly so, leaves broadly oblong symmetric narrowed at both ends, mature glabrous above rugose with impressed nerves scabrous beneath. E. canarensis, *Miq. in Pl. Hohenack.* n. 285. E. Championi, *Wight & Gardn. ms.*—W. Deccan Peninsula and Ceylon.—The common Ehretia of the Nilghiris (alt. 3–6000 feet) and other Deccan Mts. It has been regarded as a distinct species, being readily distinguished by the symmetric strong-nerved leaves.

VAR. *aspera*; leaves small obtuse mature hairy beneath. E. aspera, *Roxb. Cor. Pl.* i. 41, t. 55, and in *Fl. Ind. ed. Carey & Wall.* ii. 342; *Wall. Cat.* 902; *DC. Prodr.* ix. 507; *Bedd. For. Man.* 166; *Brand. For. Fl.* 340; *Kurz For. Fl.* ii. 209. E. tomentosa, *Roth Nov. Sp.* 126, *not of Lamk.* E. Heynii, *Roem. & Sch. Syst.* iv. 532. Beurreria aspera, *G. Don Gen. Syst.* iv. 390.—Assam.—Described from Roxburgh's example in Herb. Wallich (which agrees with his Ic. Ined. in Herb. Kew), on which the largest leaves are $1\frac{2}{3}$ by $\frac{3}{4}$ in., scabrous above, persistently hairy beneath. None of the *E. aspera* (except from E. Bengal) agrees with this exactly, the *E. aspera* of Kurz, Dalzell, &c., having larger leaves and resembling *E. lævis*, var. *pubescens*. Wight's *E. aspera* includes an example absolutely glabrous, the young leaves and calyx shining glabrous; no example of *E. lævis* type is so glabrous. A very hairy obtuse-leaved example collected at Arcot by Griffith has the calyx-lobes narrowly oblong and the style deeply bifid.

4. **E. obtusifolia.** *Hochst.*; *A. DC. Prodr.* ix. 507; leaves obovate-oblong obtuse mature hairy, flowers as of *E. lævis* but rather larger. *Brand.*

For. Fl. 340; *Boiss. Fl. Orient.* iv. 124. E. obovata, *R. Br. in Salt Abyss. Append.* iv. 64 (*name only*).

SCINDE, *Stocks.* PUNJAB; in the Salt range, *Fleming,* &c.—DISTRIB. Beloochistan, Abyssinia.

A shrub. *Leaves* 1–1⅔ in., much cuneate at the base. *Flowers* pedicelled and sessile.—Differs from *E. lævis* var. *aspera* in the narrowed base of the leaves, the more lax corymb, and the slightly larger flowers.

5. **E. retusa,** *Wall. Cat.* 903; leaves small obovate mature hairy beneath, corymbs small hairy terminal on lateral spurs, calyx-lobes lanceolate acute, flowers and fruit as in *E. lævis* but rather smaller. *DC. Prodr.* ix. 511. Beurreria retusa, *G. Don Gen. Syst.* iv. 390.

BURMA; Pagamew, *Wallich.*

Branches scraggy, as of a tough shrub. *Leaves* 1¼ by ⅔ in., base cuneate, shortly acute or obtuse not retuse, nerves distant not prominent; petiole ⅕ in.—This may be a stunted example of *E. lævis* var. *aspera*; but the leaves are much narrowed at the base, the calyx-teeth remarkably narrow and acute. In habit it is remote from *E. obtusifolia* and the flowers are hardly half as large.

6. **E. ovalifolia,** *Wight Ic.* t. 1383; innovations and corymbs pubescent or tomentose, leaves elliptic subobtuse mature glabrous. *Bedd. For. Man.* 167.—Boraginea, *Wall. Cat.* 7529.

S. MADRAS; Jyamallay, *Wight.* CEYLON; Jaffna, *Dykes.*

Otherwise as *E. lævis,* from which it only differs in the obtuse leaves. No fruit seen.

7. **E. Wightiana,** *Wall. Cat.* 7013; nearly glabrous, leaves lanceolate and obovate-lanceolate scarcely acute, corymbs mostly terminal dense. *G. Don Gen. Syst.* iv. 388; *Wight Ic.* t. 1384; *Bedd. For. Man.* 167. E. lanceolata, *Heyne in Herb. Rottl.*

S. MADRAS; Mysore, Courtallum, &c. *Wight, G. Thomson,* &c.

Leaves 1⅔ by ½ in. in Wight's type example, but larger and broader, approaching *E. lævis* in others. *Corymbs,* when young, pubescent and subtomentose in Wight's example, soon glabrescent. *Flowers* and *drupes* as of *E. lævis.*

8. **E. parallela,** *Clarke*; nearly glabrous, leaves elliptic or obovate, nerves 8 pair oblique parallel approximate, inflorescence flowers and fruit as in *E. lævis* but rather smaller.

BURMA; banks of the Irrawaddy, *Griffith* (*Kew Distrib.* n. 6004).

Branches round, glabrous. *Leaves* 1⅔ by ¾–1 in., retuse and subacute on the same branch, cuneate at the base, glabrous even when young, prominently striate by the straight primary nerves hardly ⅙ in. apart; petiole ⅕ in. *Corymbs* minutely pubescent.—Well-marked by the strong, straight, parallel, closely-placed primary nerves, not much like any other species; the leaves are usually obtuse, sometimes retuse.

9. **E. Wallichiana,** *H. f. & T.*; *Gamble Darjeeling List,* 57; nearly glabrous, leaves elliptic acuminate, corolla-tube much exceeding the calyx. Cordia acuminata, *Wall. Cat.* 896, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 339; *DC. Prodr.* ix. 499.

SIKKIM and BHOTAN, alt. 2–7000 ft., frequent; *J. D. H.,* &c. KHASIA MTS., *Wallich, Griffith.*

A tree, attaining 40 ft., flowering before the leaves. *Leaves* 5 by 2 in., base cuneate nerves 7 pair; petiole ½ in. *Corymbs* 1–3 in. diam., mostly sublateral, dense, minutely pubescent. *Calyx-lobes* $\frac{1}{16}$ in., oblong. *Corolla-tube* ⅓ in.; lobes ⅛ in., white, recurved. *Anthers* exsert. *Ovary* 2-celled, cells 2-ovulate; style bifid much less than half-way down, stigmas small capitellate. *Drupe* ¼ in. diam., subglobose, when

dry longitudinally ribbed; pyrenes 4, compressed, lunate, corrugated without, occupying the periphery of the drupe, the centre (in the dried drupe) hollow, occupied by the shrivelled fleshy tissue; pyrenes 1-seeded.—Perhaps a small-flowered form of the Hong-Kong *E. longiflora* (Champ. in Hook. Kew Journ. v. 58), which agrees exactly as to the fruit and leaves, but has the corolla-tube ½ in. long.

SECT. II. **Carmona.** *Styles* 2, undivided (1 sometimes suppressed), or 1 sub-2-partite.

10. **E. buxifolia,** *Roxb. Cor. Pl.* i. 42, t. 57, and in *Fl. Ind. ed Carey & Wall.* ii. 343; leaves small fascicled obovate entire or lobed, peduncles axillary 1- (or few-) flowered. *Wall. Cat.* 905; *DC. Prodr.* ix. 509; *Bedd. For. Man.* 167. E. heterophylla, *Spreng. Syst.* i. 648; *A. DC. l. c.* E. microphylla, *Lamk. Ill.* ii. 425. Cordia retusa, *Vahl Symb.* ii. 42. C. coromandeliana, *Koenig & Retz ms.* Carmona heterophylla, *Cav. Ic.* v. 23, t. 438.

DECCAN PENINSULA; in dry jungles, *Wight, Dalzell,* &c.—DISTRIB. Malaya to Formosa and the Philippines,

A shrub. *Leaves* 1 by ⅓ in., obtuse, very scabrous, often 3-lobed towards the apex, attenuated at the base, subsessile. *Peduncles* 0–¾ in., hairy. *Calyx-lobes* ⅙ in., lanceolate-linear. *Corolla* ¼ in., white, campanulate; lobes short, ovate. *Filaments* very short. *Drupe* ⅙ in. diam., globose; pyrene 1, 4-seeded; without any cavities in the drupes examined; with 6–8 cavities (A. DC.).

EXCLUDED SPECIES.

E. MOLLIS, *Wall. Cat.* 7011; *DC. Prodr.* ix. 511, is Mappia ovata, *Mi*[...] v. i. p. 509.

3. COLDENIA, *Linn.*

Prostrate, scabrous herbs. *Leaves* alternate, crisped. *Flowers* axillary, sessile (or nearly so), the upper sometimes in a one-sided leafy spike, white. *Sepals* 4–5, narrow. *Corolla*-tube short, lobes 4–5, imbricated in the bud, patent. *Stamens* 4–5, on the corolla-tube; anthers ovate. *Ovary* 2-celled with 2 ovules in each cell, or sub-4-celled with solitary ovules; style terminal, bifid. *Drupe* (nearly dry) of 4, subconnate, 1-seeded, pyrenes. Testa of the *seed* thin; albumen 0, or scanty; cotyledons flat.—Species 10 American, and the following.

1. **C. procumbens,** *Linn.*; *DC. Prodr.* ix. 558; procumbent, scabrous-hairy, leaves elliptic-obovate coarsely serrate or subpinnatifid, pyrenes subconnate into an acute 4-ribbed pyramid. *Gaertn. Fruct.* i. 329, t. 68; *Lamk. Ill.* t. 89; *Roxb. Fl. Ind.* i. 448; *Wall. Cat.* 942; *Dalz. & Gibs. Bomb. Fl.* 171. Lobophyllum tetrandrum, *F. Muell. in Hook. Kew Journ.* ix. 21. Waltheria microphylla, *Miq. in. Pl. Hohenack.* n. 87 *b. not of Cav.*

Throughout tropical INDIA, a weed.—DISTRIB. Asia, Africa, Australia, America.

Annual, usually quite flat. *Leaves* 1–1½ in. *Flowers* ⅛ in. *Pyrenes* ⅙ in. *Seeds* albuminous.

4. RHABDIA, *Mart.*

A shrub; branches twiggy. *Leaves* small, alternate or clustered, linear-oblong, entire or toothed. *Flowers* small; racemes very small, few-fld., subterminal on short lateral branches. *Sepals* 5, lanceolate, acuminate. *Corolla* pink-purple, tube short, campanulate; lobes oblong, imbricate in the bud. *Stamens* 5, on the corolla-tube; anthers oblong or ovate. *Ovary* 2-celled, cells 2-ovuled, or sub-4-celled with cells 1-ovuled; style terminal, stigma capitate

or minutely 2-lobed. *Drupe* with 4 crustaceous 1-seeded pyrenes. *Seeds* oblong, albumen thin.

1. **R. lycioides,** *Mart. Nov. Gen. & Sp.* ii. 137, t. 195; *DC. Prodr.* ix 512; *Fresen. in Mart. Fl. Bras. Fasc.* xxii. 58, t. 9, fig. 9. R. viminea, *Dalz. & Gibs. Bomb. Fl.* 170; *Hook. Ic. Pl.* t. 823; *Brand. For. Fl.* 341; *Kurz For. Fl.* ii. 211. R. fluvialis, *Edgew. Pl. Banda*, 51. R. crebrifolia, *Miers Contrib.* ii. 222, t. 84. Rotula aquatica, *Lour. Fl. Cochinch.* 121; *DC. Prodr.* ix. 531. Ehretia viminea, *Wall. Cat.* 906; *DC. l. c.* 509. E. cuneata, *Wight Ic.* t. 1385.—Careyæ sp. *Miq. in Pl. Hohenack.* n. 688.

INDIA, alt. 0–2500 ft.; from Kumaon and Assam to CEYLON and Tenasserim, frequent; especially on gravelly banks flooded by rapid streams.—DISTRIB. Tropical S.E. Asia, Africa, and Brazil.

Height 2–6 ft. *Leaves* $\frac{3}{4}$ by $\frac{1}{5}$ in. *Flowers* $\frac{1}{4}$ in. *Drupe* $\frac{1}{6}$ in., yellow or brown-red, nearly dry.

5. TOURNEFORTIA, *Linn.*

Trees or shrubs, often rambling or subscandent. *Leaves* alternate, entire. *Cymes* terminal, rarely lateral or extra-axillary, dichotomous, scorpioid; flowers numerous, dense, sessile or very shortly pedicelled, ebracteate, white or greenish-yellow. *Sepals* 5 or 4, lanceolate or ovate. *Corolla-tube* cylindric (short in *T. argentea*), naked in the throat; lobes 5 or 4, small, patent. *Stamens* 5 or 4, included in the tube, filaments short; anthers oblong. *Ovary* 4-celled; style terminal, short, shortly 2-lobed (in the Indian species); ovules 1 in each cell. *Drupe* small, ovoid, scarcely fleshy, not distinctly separating into 2 or 4 pyrenes; pyrenes two 2-celled 2-seeded (in the Indian species). *Seed* straight or curved, albuminous.—DISTRIB. Species 100; in the tropics of both hemispheres.

SECT. 1. **Mallota.** An erect, densely silky shrub. *Leaves* narrowed at the base. *Corolla* subrotate, tube very short.

1. **T. argentea,** *Linn. f. Suppl.* 133; branches and leaves on both surfaces fulvous-sericeous, leaves obovate-lanceolate, cymes very dense. *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 4; *Blume Bijd.* 844; *DC. Prodr.* ix. 514.—*Rumph. Herb. Amboin.* iv. t. 55.

Seashores of CEYLON and the MALAY PENINSULA. NICOBARS; *Kurz.*—DISTRIB. Malaya, Australia, Mauritius.

Branchlets thick. *Leaves* 6 by 2 in., acute or subobtuse; petiole ill-defined. *Peduncles* terminal, or from an upper axil, 1–5 in.; cymes often forming a panicle 6 in. diam.; flowers sessile. *Sepals* $\frac{1}{20}$ in., ovate, densely woolly, ultimately glabrescent. *Corolla-tube* hardly as long as the sepals; lobes $\frac{1}{10}$ in., ovate, crenulate. *Stigma* subsessile, obscurely 2-lobed. *Drupes* $\frac{1}{4}$ in. diam., subglobose.

SECT. 2. **Pittonia.** Rambling or subscandent shrubs. *Leaves* obtuse at the base, distinctly petioled. *Corolla* 5-merous, narrowly tubular.

* *Drupes shortly pedicelled (all from the Deccan).*

2. **T. Heyneana,** *Wall. Cat.* 910 (*Heyne's specimen*) *not of DC.*; leaves oblong-lanceolate, corolla-tube $\frac{1}{8}$–$\frac{1}{6}$ in. T. cymosa, *Heyne in Herb. Rottler, not of Linn.*

DECCAN PENINSULA, *Heyne*; Nilgherries (near Nadooputtah), *Wight.*

Branchlets sparsely scabrous-hairy. *Leaves* 5 by $1\frac{1}{2}$ in., acuminate, base cuneate or rhomboid, mature sparsely minutely scabrous-hairy on both surfaces; nerves 7 pair, closely hairy when young; petiole $\frac{1}{3}$ in. *Cymes* terminal and extra-axillary, sparsely scabrous-hairy. *Calyx-teeth* $\frac{1}{12}$ in., lanceolate. *Drupes* $\frac{1}{8}$ in., or pedicels $\frac{1}{8}$ in.—Wallich appears to have received a small quantity of this species, and to have named

it *T. Heyneana*; subsequently to have placed with it a large quantity of a Khasian species, *T. Candollii*, Clarke, which he distributed as *T. Heyneana.*

3. **T. reticosa,** *Wight Ic.* t. 1386; leaves oblong acuminate glabrescent prominently reticulate beneath, corolla-tube $\frac{1}{3}$–$\frac{1}{2}$ in.

NILGHERRIES & COORG; *Wight.*

Branchlets softly, sparsely hairy. *Leaves* 5½ by 1⅔ in., base rhomboid or rounded, mature very sparsely hairy above; nerves 8 pair, tertiary densely anastomosing; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* terminal; flowers sub-1-serial; pedicels (at flower-time) $\frac{1}{16}$–$\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{16}$–$\frac{1}{12}$ in. *Drupe* not seen.

4. **T. Wightii,** *Clarke*; leaves subcordate ovate-lanceolate mature hairy beneath, corolla-tube $\frac{1}{4}$–$\frac{1}{3}$ in.

DECCAN PENINSULA; *Wight.*

More hairy than the preceding species. *Leaves* 3½ by 1¾ in.; nerves 8 pair, subimpressed on the upper surface, tertiary obscure; petiole $\frac{1}{3}$ in. *Cyme* extra-axillary; flowers sub-1-serial; pedicels (at flower-time) 0–$\frac{1}{16}$ in. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate-linear. *Drupe* not seen.—This differs (inter alia) from *T. reticosa* by the primary nerves being much more approximate.

** *Drupes sessile or nearly so (species of Bengal and the E. Peninsula).*

5. **T. Roxburghii,** *Clarke*; leaves oblong acuminate shortly densely villous beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{3}$ in.

CHITTAGONG; Seetakoond, Bindravun, Rungamuttea, *J. D. H.*, &c.

Branches hairy. *Leaves* 4 by 1½ in., sometimes subovate, not rugose above, tertiary nerves obscurely reticulated; petiole $\frac{1}{3}$ in. *Cymes* terminal and supra-axillary; flowers sub-2-seriate. *Calyx-teeth* $\frac{1}{8}$ in. *Drupes* $\frac{1}{8}$–$\frac{1}{6}$ in., sessile, sub-2-seriate; calyx not glistening white within.—Easily separated from all other species of this subsection by its longer corolla. Roxburgh collected his *Lithospermum viridiflorum* in Chittagong (where this is the only species known, and is frequent, on Roxburgh's collecting ground near Sir W. Jones's country-seat), and his description seems (at least partly) drawn therefrom: but his picture, and the Calcutta Botanic Garden authentic examples, refer to the next species.

6. **T. viridiflora,** *Wall. Cat.* 907, and in *Fl. Ind. ed. Carey & Wall.* ii. 5; leaves oblong acuminate softly hairy beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{8}$ in. *DC. Prodr.* ix. 516. Lithospermum viridiflorum, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 4. Heliotropium viridiflorum, *Lehm. Asperifol.* 30.

ASSAM; *Griffith, Masters.* SILHET; *Wallich.*

Branches hairy. *Leaves* 3½ by 1¼ in., sometimes subovate, in age wrinkled above, tertiary nerves obscure; petiole $\frac{1}{3}$ in. *Cymes* terminal, rusty-villous; flowers 2-ranked, very dense. *Calyx-teeth* $\frac{1}{10}$ in. *Corolla-tube* little exceeding the calyx-teeth, not exceeding $\frac{1}{8}$ in. in the large cultivated examples from the Calcutta garden. *Drupes* $\frac{1}{8}$–$\frac{1}{6}$ in., sessile; calyx-lobes in fruit very narrow, not white glistening within.

VAR. *Griffithii*; mature leaves nearly glabrous beneath distinctly reticulated.—Khasia & Assam; *Griffith.*

7. **T. Candollii,** *Clarke*; leaves ovate-lanceolate softly hairy beneath, calyx-teeth lanceolate-linear corolla-tube $\frac{1}{4}$ in. T. Heyneana, *DC. Prodr.* ix. 516; *Wall. Cat.* 910, *as to the Khasia examples.*

BHOTAN, ASSAM, KHASIA, and SILHET, frequent; *Wallich, Griffith,* &c.

Branches hairy. *Leaves* 3½ by 1½ in., sometimes oblong, base obtuse or subcordate; primary nerves soon impressed on the upper surface, tertiary very obscurely reticulated; petiole $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{10}$ in., in fruit narrowly lanceolate, not glistening white within. *Drupes* $\frac{1}{6}$–$\frac{1}{5}$ in., sessile.—This species is remote from *T. Heyneana*: it is nearly intermediate between *T. viridiflora* and *T. ovata*, differing little from *T. viridiflora*, var. *Griffithii*, but in the longer corolla.

8. **T. ovata,** *Wall. Cat.* 908; leaves ovate and elliptic suddenly shortly acuminate hairy or glabrescent beneath, calyx-teeth ovate-lanceolate in fruit glistening white-setose within, corolla-tube $\frac{1}{4}$–$\frac{1}{3}$ in. *G. Don Gen. Syst.* iv. 369; *DC. Prodr.* 516.

BRITISH BURMA; Rangoon, *Wallich, M'Clelland.* S. ANDAMAN; *Kurz.*

Scandent, branches hairy. *Leaves* 3–6 in., rhomboid at the base; tertiary nerves obscure. *Calyx-teeth* $\frac{1}{12}$ in., about $\frac{1}{4}$ the length of the corolla-tube. *Drupes* $\frac{1}{5}$–$\frac{1}{4}$ in., sessile.—In Kurz example, the corolla is permanent, the base greatly enlarged so as to include the fruit; this state appears induced by the attack of an insect.

9. **T. khasiana,** *Clarke*; leaves ovate acuminate glabrescent base obtuse or subcordate, calyx-teeth ovate acute small, corolla-tube exceeding $\frac{1}{4}$ in.

KHASIA MTS.; Nongpriang, alt. 1500 ft., *Clarke.*

Branchlets minutely hairy. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., gradually acuminated, tertiary nerves reticulated not very prominent; petiole $\frac{1}{3}$ in. *Cymes* rusty-pubescent; branches few, long, densely fld. *Calyx-teeth* scarcely $\frac{1}{16}$ in. *Drupe* not seen.

10. **T. Hookeri,** *Clarke;* leaves ovate or elliptic acute glabrescent prominently reticulated beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{6}$–$\frac{1}{5}$ in. hardly exceeding the calyx. T. viridiflora, *Gamble Darjeeling List,* 57, *not of Wall.*

SIKKIM; alt. 2–5000 ft., frequent; *J. D. H.,* &c.

Large, subscandent; branches nearly glabrous. *Leaves* 4–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., obtuse and unequal at the base; tertiary nerves exceedingly prominent; petiole $\frac{1}{3}$ in. *Cymes* terminal, diffuse, rusty pubescent; branches long; flowers sub-2-seriate. *Calyx-teeth* $\frac{1}{8}$ in. *Drupes* $\frac{1}{5}$ in., ovoid, sessile.

VAR. *subtropica*; corolla-tube more than $\frac{1}{4}$ in. pentagonal with 5 hairy lines without, more than twice as long as the calyx-tube.—Sikkim; by the great Rungait, *J. D. H.*

SECT. 3. **Tetrandra.** Rambling or subscandent shrubs. *Leaves* obtuse at the base, distinctly petioled. *Corolla* 4-merous, narrowly tubular.

11. **T. Wallichii,** *DC. Prodr.* ix. 527; leaves ovate acute glabrescent base rounded, corolla-tube scarcely $\frac{1}{4}$ in. twice or thrice as long as the calyx. T. tetrandra, *Wall. Cat.* 911, *not of Blume.* Tetrandra Wallichii, *Miq. Fl. Ind. Bat.* ii. 928.

SINGAPORE & PENANG; *Wallich, Maingay.* NICOBARS; *Kurz.*

Branches nearly glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., tertiary nerves obscure; petiole $\frac{1}{4}$ in. *Cymes* terminal, lax. *Calyx-teeth* $\frac{1}{20}$ in., triangular-lanceolate. *Drupes* $\frac{1}{8}$ in., sessile.—Tetrandra glabra, *Miq. Fl. Ind. Bat.* ii. 929, has oblong leaves narrowed at the base; T. Zollingeri, *Miq. l. c.* 928, has flowers $\frac{1}{3}$ in. long; these two make up the old Tournefortia tetrandra, *Blume Bijd.* 845, *DC. l. c.* More material may reduce the 4 species of this section to 1.

12. **T. Walkeræ,** *Clarke*; leaves oblong acuminate glabrescent reticulated beneath, corolla-tube $\frac{1}{3}$ in. very narrow. T. Wallichii, *Thwaites Enum.* 214.

CEYLON; *Walker, Thwaites.*

Leaves $3\frac{1}{2}$ by 1–$1\frac{1}{4}$ in., base ronnded; upper surface rugose by the impression of the nerves.—This seems nearer both *Tetrandra glabra* and *Zollingeri* than to *Tournefortia Wallichii.*

DOUBTFUL SPECIES.

T. ARBORESCENS, *Lamk. Ill.* ii. 417; *DC. Prodr.* ix. 529, is described as a tree from India. No tree belonging to the genus is known in British India.

T. TERNATA, *Wall. Cat.* 912, from Tavoy; there is no specimen of this in Wallich's Herbarium.

6. **HELIOTROPIUM,** *Linn.*

Annual or perennial herbs, rarely (non-Indian species) shrubby, villous or scabrous. *Leaves* alternate. *Cymes* terminal, dichotomous; branches often long, scorpioid; flowers small, white or nearly so in the Indian species; bracts small, 0, or leafy (inflorescence axillary). *Calyx* 5-partite or -lobed; segments lanceolate or linear (except in Sect. *Piptoclaina*). *Corolla* tubular, throat not hairy; lobes 5, imbricate or induplicate in the bud, spreading in flower. *Stamens* 5, on the corolla-tube, included, filaments very short; anthers ovate or lanceolate. *Ovary* completely or imperfectly 4-celled, 4-ovulate; style terminal, short or long, ending in a depressed conical or flat disc; stigma above the disc 0 or short or elongate-lanceolate, entire, rarely with 2 linear branches (Sect. *Ditrichostigma*). *Fruit* dry, 2–4-lobed, of 4 more or less free nutlets. *Seeds* straight or curved, albumen small or 0 (rarely plentiful).—Species 100, in the tropical and temperate zones of both hemispheres.

SECT. 1. **Messerschmidia.** *Corolla-lobes* patent, caudate-acuminate. *Style* longer than the stigma.

1. **H. zeylanicum,** *Lamk. Ill.* ii. 393, *not of Wall*; leaves narrowly lanceolate, spikes elongate ebracteate, stigma short-oblong densely hairy included in the corolla-tube. *Burm. Fl. Ind.* t. 16, fig. 2. *Wight Ic.* t. 892; H. paniculatum, *Heyne in Herb. Rottler, not of Br. nor of Roxb.* Tournefortia subulata, *Hochst.*; *A. DC. Prodr.* ix. 528; *Dalz. & Gibs. Bomb. Fl.* 171. T. Royleana & Edgeworthii, *DC. Prodr.* ix. 527, 529. T. zeylanica, *Wight Ill.* t. 170. Messerschmidia hispida, *Benth. in Royle Ill.* 306.

W. INDIA, from the Punjab to the W. Deccan Peninsula; *Royle, Edgeworth, Wight,* &c.—DISTRIB. Tropical Africa.

Annual, erect, 1–3 ft., scabrous-hairy. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at both ends, subentire, sessile; nerves obscure in the upper surface. *Spikes* 2–6 in. in fruit; flowers sessile, 1–2-ranked. *Sepals* $\frac{1}{16}$ in., ovate, acute. *Corolla-tube* $\frac{1}{6}$ in., wider in the upper half, minutely setose without; lobes $\frac{1}{16}$ in. *Style* glabrous, half as long as the corolla-tube; stigma surrounded by the stamens in the swollen upper half. *Fruit* $\frac{1}{12}$ in., of 2 rugose pitted 2-seeded nutlets.

SECT II. **Catimas.** *Corolla-lobes* with an abruptly inflexed mucro. *Stigma* elongate-conic.

2. **H. dasycarpum,** *Ledeb.*; *Eichw. Itin. Casp.-Caucas.* ii. t. 5; leaves small elliptic, spikes few-flowered, style short, stigma minutely scabrous included in the corolla-tube. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 323; *Boiss. Fl. Orient.* iv. 140. H. Schrenkianum, *Ledeb. Fl. Ross.* iii. 102, *fide Boiss. l. c.* H. brahuicum, *Stocks in Hook. Kew Journ.* iv. 173. H. luteum, *Aitchison Cat. Punjab.* 94 (? *Poir*).

PANJAB; Peshawur, *Stewart.*—DISTRIB. Beloochistan, Cabul, Persia, Turkestan, Soongaria.

Woody, rigid, 6–18 in., suberect, scabrous-hairy. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., mostly cuneate at both ends, subentire, sessile or lower obscurely petioled; nerves obscure in the upper surface. *Spikes* in flower short, in fruit 2–4 in., lower flowers often an inch apart; flowers mostly sessile, but stray lower flowers have pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{10}$ in., oblong-lanceolate. *Corolla-tube* $\frac{1}{6}$ in., cylindric or slightly narrower upwards, hairy without. *Filaments* rather long; anthers ovate-oblong near the top of the tube. *Style* about $\frac{1}{4}$ the length of the stigma, minutely retrorse setose (in Stocks' examples as in Eichwald's picture, but Boissier says style as long as the stigma). *Fruit* small, glabrous in Stocks' example, sometimes silky (*Boiss.*).—Very near *H. luteum*, Poir. (DC. Prodr. ix. 532) which has larger flowers and fruits, and more rugose leaves.

SECT. III. **Monimantha,** *Franch.* *Stigma* with 2 linear branches exsert from the corolla.

3. **H. ophioglossum,** *Stocks*; *Aitchison Cat. Punjab.* 94; leaves lanceolate, spikes elongate many-flowered, corolla-lobes round crenate. *Boiss. Fl. Orient.* iv. 145. H. stylosum, *Franch. Sert. Somal. in Mission Révoil.* 45, t. 4, *not Philippi.*

SCINDE; Kurrachee, *Stocks.*—DISTRIB. Beloochistan, Somali-land.

Woody, 6–15 in., branched from the base, scabrous-hairy. *Leaves* 1 by $\frac{1}{3}$ in., tip cuneate, base attenuated or subpetioled, subentire, nerves obscure on the upper surface. *Spikes* 2–6 in.; flowers sessile, 1–2-ranked. *Sepals* $\frac{1}{6}$ in., lanceolate. *Corolla-tube* scarcely longer than the sepals, cylindric, minutely scabrous without. *Anthers* linear, occupying the upper half of the corolla-tube. *Style* very short; stigma conico-linear, nearly as long as the corolla-tube. *Nutlets* 4, $\frac{1}{16}$ in., glabrous.

SECT. IV. **Piptoclaina.** *Calyx-lobes* short, subvalvate. *Fruit* enclosed by the calyx.

4. **H. supinum,** *Linn.*; *DC. Prodr.* ix. 533; leaves petioled elliptic or ovate subobtuse, spikes short woolly, nut solitary (sometimes 2) large rugose margined. *Sibth. Fl. Græc.* t. 157; *Wight Ic.* t. 1387; *Dalz. & Gibs. Bomb. Fl.* 171; *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 289; *Boiss. Fl. Orient.* iv. 127. Piptoclaina supina, *G. Don Gen. Syst.* iv. 364. Lithospermum heliotropoides, *Forsk. Fl. Æg. Arab.* 39.

PUNJAB and UPPER GANGETIC PLAIN; *Royle, Edgeworth,* &c.—DISTRIB. W. Asia, S. Europe, N. Central Africa.

Annual, prostrate, 1 ft. diam., much branched, shortly softly villous. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., subentire; nerves often impressed on the upper surface. *Calyx* $\frac{1}{8}$ in., ovate, woolly. *Corolla-tube* $\frac{1}{5}$ in., ovate; lobes very small, round. *Anthers* ovate-oblong, near the top of the tube. *Stigma* conical, hairy, nearly as long as the style, included. *Nutlets* $\frac{1}{6}$ by $\frac{1}{8}$ in., margins broad, smooth; often 2 in the Indian examples.

VAR. *malabarica*; nuts usually 4 smaller in horizontal section triangular without margins. H. malabarica, *Retz Obs.* iv. 24; *Roxb. Fl. Ind.* i. 454; *Wall. Cat.* 7014. Piptoclaina malabarica, *G. Don Gen. Syst.* iv. 364.—W. Deccan Peninsula, from Central India (*Edgeworth*) to Tinnevelly (*Wight*), frequent. Cutch & Scinde, *Stocks, Stoliczka.*—Bunge (l. c. 287) excludes from the section *Piptoclaina* all the species with 4 nutlets, and objects to regarding *H. malabaricum* as a var. of *H. supinum*; but there is every gradation between the two forms of fruit in the Indian collections; an example, marked as collected at Darjeeling in Herb. Griffith, has 2–3 or 3–4 nuts.

SECT. V. **Euheliotropium.** *Sepals* narrow, not enclosing the fruit. *Corolla-lobes* plicate or crenulate, neither patent cuspidate nor with closely-incurved mucro. *Style* short; stigma conic, entire or minutely 2-fid or (in *H. rariflorum* and *myosotoides*) capitate, included in the corolla-tube. *Nutlets* not spreading, forming an ovoid 4-pointed mitre-like fruit, with a small hole at the apex.

* *Leaves obovate or elliptic, silky scarcely scabrous, subentire; flowers sessile.*

5. **H. Eichwaldi,** *Steud*; *DC. Prodr.* ix. 535; leaves obovate lower long-petioled softly closely hairy, spikes dense ebracteate, flowers 2-ranked, calyx deciduous with the fruit, nutlets glabrous minutely verrucose. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 292; *Boiss. Fl. Orient.* iv. 131. H. ellipticum, *Ledeb.*; *Eichw. Itin. Casp.-Caucas.* 10, t. 4, *not of Salt.* H. strictum, *Ledeb. Fl. Ross.* iii. 100. H. macrocarpum, *Guss. Pl. Inarime,* 214, t. 7, fig. 2, and *g,*

h. H. europæum, *Aitchison Cat. Punjab.* 94; *Benth. Fl. Austral.* iv. 394; ?*Linn.*; *DC. l. c.* 534.

PUNJAB and SCINDE; in the plains, frequent. KASHMIR; Srinuggur, alt. 5,200 ft. —DISTRIB. W. and Central Asia. Australia.

Stems woody; branches from the base, 6–12 in., softly closely hairy. *Leaves* $\frac{1}{4}$–1$\frac{1}{2}$ in., obtuse; nerves not prominent on the upper surface; petiole $\frac{1}{8}$–1 in. *Spikes* 2 in. *Sepals* $\frac{1}{12}$ in., ovate-lanceolate, hairy. *Corolla-tube* $\frac{1}{8}$ in., narrow, cylindric, hairy without; segments small, round, crenulate. *Stigma* microscopically scabrous. *Nutlets* $\frac{1}{12}$ in.—Differs from *H. europæum*, Linn., in the more softly hairy leaves and spikes; as to the minute differences in the stigma (shown by *Gussone l. c.*) they do not apply satisfactorily to the Indian and Australian materials.

VAR. *lasiocarpum*; nuts hispid-silky sparingly rugose. H. lasiocarpum, *Fisch & Mey. Ind. Sem.* iv. 38; *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 292; *Boiss. Fl. Orient.* iv. 131.—N.W. India; *ex Boiss. l. c.*, but all the Indian examples seen suit *H. Eichwaldi* so far as the two differ.

6. **H. calcareum,** *Stocks in Hook. Kew Journ.* iv. 174; leaves obovate lower long-petioled softly closely hairy, spikes elongate ebracteate, flowers 1-ranked, calyx persistent after the setulose nutlets have fallen. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 303; *Boiss. Fl. Orient.* iv. 128. H. cinerascens, *Aitchison Cat. Punjab.* 94, *not of Steud.*

SCINDE; *Stocks.*—DISTRIB. Beloochistan.

Stem and leaves nearly as of *H. Eichwaldi*, but indumentum more ash-coloured. *Spikes* often 6 in. *Sepals* $\frac{1}{10}$ in., lanceolate, hairy. *Corolla-tube* $\frac{1}{8}$ in., cylindric, hairy without; lobes small, round, crenate. *Stigma* conic elongate, minutely bifid at the apex. *Nutlets* $\frac{1}{16}$ in.

7. **H. ovalifolium,** *Forsk. Fl. Æg.-Arab.* 38; leaves elliptic or obovate softly closely hairy lower long-petioled, spikes elongate persistently bracteate. *Roth Nov. Sp.* 103; *Wall. Cat.* 2089. H. coromandelianum, *Retz. Obs.* ii. 9; *DC. Prodr.* ix. 541; *Wall. Cat.* 7016; *Wight Ic.* t. 1388; *Dalz. & Gibs. Bomb. Fl.* 171. H. tomentosum *and* polystachyum, *Poir. Dict. Suppl.* iii. 23; *DC. l. c.* 549. H. gracile, *Br. Prodr.* 493. H. obovatum, *Don Prodr.* 101; *DC. l. c.* 548. H. Kunzei, *Lehm.*; *DC. l.c.* 541; *Boiss. Fl. Orient.* iv. 130. H. Syenites, *Spreng. Syst.* i. 539. H. Brocchianum, *Vis. Pl. Æg.-Nub.* 8, t. 2, fig. 1. H. niloticum, *A. DC. Prodr.* ix. 541.

BENGAL, DECCAN PENINSULA and SCINDE; frequent.—DISTRIB. Tropical Africa and Australia.

Stems woody; branches 1 ft., ascending, softly hairy. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., or in the western examples hardly half so large, obtuse with or without a mucro; nerves not prominent. *Spikes* 1–4 in., dense; bracts $\frac{1}{10}$–$\frac{1}{8}$ in., ovate, acute. *Sepals* $\frac{1}{12}$ in., elliptic, acute. *Corolla-tube* $\frac{1}{10}$ in., cylindric; lobes minute, ovate, patent, subacute. *Stigma* minutely hairy. *Nutlets* $\frac{1}{16}$ in., densely setulose.

** *Leaves lanceolate, bristly, margins crisped-crenulate; flowers sessile, ebracteate.*

8. **H. undulatum,** *Vahl Symb.* i. 13; leaves obscurely petioled, spikes rigid branches short, nutlets small hispid. *Wall. Cat.* 916; *DC. Prodr.* ix. 536; *Boiss. Fl. Orient.* iv. 147. H. persicum, *Lamk. Dict.* iii. 94; *Burm. Fl. Ind.* 41, t. 19; *DC. l. c.* 537; *Boiss. Fl. Orient.* iv. 147. H. crispum, *Desf. Fl. Atlant.* i. 151, t. 41. H. eriocarpum, *Delile*; *Lehm. Asperifol.* 55 (*fide Boiss.*). H. ramosissimum, *Sieb.*; *DC. l. c.* 536. H. affghanum, *Boiss. Fl. Orient.* iv. 143. Lithospermum hispidum, *Forsk. Fl. Æg.-Arab.* 38.

PUNJAB, SCINDE, and UPPER GANGETIC PLAIN, alt. 0–1000 ft., frequent.—DISTRIB. W. Asia and N. Africa.

Suberect, 6–24 in., branched, harsh, scabrous. *Leaves* $\frac{1}{2}$–1$\frac{1}{4}$ in., often rugose

Sepals $\frac{1}{16}$ in., oblong, scabrous, rigid, persistent after the nutlets have fallen. *Corolla-tube* $\frac{1}{8}$ in., tubular, scabrous without; lobes very small, ovate. *Nutlets* 4, $\frac{1}{12}$ in., verrucose or bristly.—Boissier says that *H. affghanum* has the corolla hairy within, and thus differs from *H. undulatum*, but the type of *H. affghanum* (viz., Griffith, Kew Distrib. n. 5936) altogether agrees with *H. undulatum*.

VAR. *suberosa*; fruits depressed-globose $\frac{1}{5}$ in. diam. glabrous dividing into 2 two-seeded nutlets with corky cells on the back. H. nubicum, *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 330?.—Scinde, *Stocks.* The seeds are as in *H. undulatum.* This was collected by Stocks as part of his n. 473, and is probably a variety of *H. undulatum* affected by an insect-punctures; but it is remarkable that Stocks' example has very numerous flowers and fruits, and that every ovary, without exception, appears to form a corky fruit.

*** *Leaves small or very narrow, subentire, scabrous hairy; flowers mostly bracteate, lower often pedicelled or with leaflike bracts.*

† *Stigma elongate conic.*

9. **H. Rottleri,** *Lehm. Asperifol.* 66; woody, leaves small oblong, racemes long with distant flowers, fruit depressed distinctly 4-lobed completely covered by short grey adpressed hairs with a depressed hollow at the apex whence springs the style. *DC. Prodr.* ix. 549; *Wight Ic.* t. 1392; *Dalz. & Gibs. Bomb. Fl.* 171.

DECCAN PENINSULA; Coimbatore, alt. 1000 ft., *Wight,* &c.

Very harsh, with stiff curved branches. *Leaves* $\frac{1}{3}$ by $\frac{1}{6}$ in., sessile, scattered, margins recurved when dry. *Racemes* 2–4 in., stiff, curved; pedicels solitary, each opposite a bract. *Sepals* $\frac{1}{12}$ in., ovate, acute, similar to the bracts. *Stigma* ovate, shortly acute. *Fruit* $\frac{1}{16}$ in. long by $\frac{1}{12}$ broad.

10. **H. paniculatum,** *Br. Prodr.* 494, *not of Roxb.*; erect, subvirgate, leaves linear, racemes filiform elongate, fruit depressed subdivaricately 4-lobed glabrous or with few scattered minute hairs. *DC. Prodr.* ix. 547; *Benth. Fl. Austral.* iv. 399. H. glabellum, *Br. l. c.* 494; *DC. l. c.* 548. H. linifolium, *Lehm. Asperifol.* 35; *DC. l. c.* 547; *Wight Ic.* t. 1391. H. tenue, *Wall. Cat.* 915; *DC. l. c.* 548, *not of Roem. & Sch.* H. zeylanicum, *Heyne in Herb. Rottl.*; *DC.* (under *H. glabellum*) *l. c.* 548. Cynoglossum zeylanicum, *Wight in Wall. Cat.* 7018, *not* Heliotropium zeylanicum, *Wall.*

S. DECCAN and CEYLON, *Rottler, Wight.* PEGU, *Wallich.*—DISTRIB. Siam, Australia.

Branches erect, twiggy. *Leaves* 1 by $\frac{1}{10}$ in. *Racemes* 2–6 in.; pedicels subopposite a small linear bract or often extra-axillary. *Sepals* $\frac{1}{24}$ in., ovate, acute. *Stigma* conical-linear. *Fruit* $\frac{1}{20}$ by $\frac{1}{12}$ in.—Wight called a rather stouter form, with leaves $\frac{1}{8}$ in. wide and larger flowers, *H. tenue*, the ordinary form *H. linifolium*; but the difference is slight.

11. **H. strigosum,** *Willd. Sp. Pl.* i. 743; ramous, leaves small linear-lanceolate, spikes mostly elongate, upper flowers sessile not conspicuously bracteate, fruit ovoid not or obscurely 4-lobed with minute grey hairs. *DC. Prodr.* ix. 546; *Boiss. Fl. Orient.* iv. 143.

Throughout INDIA; very common.—DISTRIB. W. Asia, Malaya, Australia.

Usually procumbent, intricately branched. *Leaves* $\frac{2}{3}$ by $\frac{1}{10}$ in. Lower *flowers* of the spike often pedicelled, with larger bracts. *Sepals* $\frac{1}{12}$ in., ovate-lanceolate. *Stigma* ovate, linear. *Fruit* $\frac{1}{16}$–$\frac{1}{12}$ in. long and broad, depressed conical at the apex.

VAR. *brevifolia*; leaves $\frac{1}{4}$ by $\frac{1}{10}$ in. narrowly lanceolate. H. brevifolium, *Wall. Cat.* 914, and in *Roxb. Fl. Ind. ed Carey & Wall.* ii. 2; *DC. l. c.* 546. H. compactum, *Don Prodr.* 101.—Throughout India, even more abundant than *H. strigosum* type.

12. **H. bracteatum,** *DC. Prodr.* 493; suberect, leaves lanceolate, spikes shortened, flowers crowded among prominent bracts, fruit distinctly 4-lobed

glabrous chestnut-brown below scabrous or minutely hairy near the apex. *DC. Prodr.* ix. 547; *Benth. Fl. Austral.* iv. 397. H. foliatum, *Br. l.c.* 493; *DC. l.c.* 548. H. ramosum, *Roxb.*; *Wall. Cat.* 7015. H. cyrtostachyum, *Miq. Fl. Ind. Bat.* ii. 924.

S. DECCAN PENINSULA and CEYLON.—DISTRIB. Java, Australia.

Stems 4–8 in., strict or with ascending branches. *Leaves* ¾ by ⅛–⅙ in., not very acute. *Sepals* ⅛ in., lanceolate, smaller than many of the bracts.

VAR. *laxiflora*; spikes elongate or (in *H. zeylanicum*, Wall.) filiform. H. laxiflorum, *DC. l. c.* 548; *Dalz. & Gibs. Bomb. Fl.* 171. H. zeylanicum, *Wall. Cat.* 2091, *not of Lamk.*—S. Deccan Peninsula and Ceylon, *Heyne, Wight.*

13. **H. marifolium**, *Retz. Obs.* ii. 8; leaves lanceolate acute scabrous cauline often large, spikes 1–2 in. dichotomous rigid dense curved conspicuously bracteate, fruit 4-lobed chestnut-brown below shortly bristly.

DECCAN PENINSULA; from Chota Nagpore and Rajpootana to Cape Comorin.

Stems rigid, divaricately ramous, not intricate. Cauline *leaves* 1¼ by ¼ in., harsh. *Flowers* and *fruits* rather larger than those of *H. bracteatum* from which it is perhaps not distinct.

VAR. *Wallichii*; stems decumbent intricately ramous, leaves smaller less harsh, spikes elongate, flowers and fruits nearly of *H. bracteatum*. H. marifolium, *Wall. Cat.* 2092; *DC. Prodr.* ix. 547; *Wight Ic.* t. 1390; *Dalz & Gibs. Bomb. Fl.* 171. Cynoglossum marifolium, *Roxb. Fl. Ind.* i. 457. Bothriospermum ? marifolium, *A. DC. Prodr.* x. 116.—Throughout India. Distinguished from *H. strigosum* by its broader leaves and 4-lobed fruit. Except in its very ramous habit this does not differ from *H. bracteatum*, var. *laxiflora*. Anthers ovate with linear twisted tips (as in allied species) described by Roxburgh as "scales" between the corolla-lobes which error has misled A. DC.

14. **H. scabrum**, *Retz. Obs.* ii. 8; procumbent, densely leafy, leaves lanceolate acute, flowers subcapitate among leaflike bracts, fruit 4-lobed chestnut glabrous or minutely hairy near the apex. *Wall. Cat.* 7017; *Wight Ic.* t. 1389.

DECCAN PENINSULA and CEYLON; frequent.

Forming dense tufts with fascicled leaves. Probably not specifically distinct from *H. marifolium*.

†† *Stigma subcapitate.*

15. **H. rariflorum**, *Stocks in Hook. Kew Journ.* iv. 174; erect, branched, leaves linear, spikes elongate bracteate, fruit 4-lobed bristly. *Boiss. Fl. Orient.* iv. 144. Lithospermum leucophlæum, *Schweinf. Herb. Afr. Centr.* n. 696.

SCINDE; Kurrachee, *Stocks.* PUNJAB; Jhelum, *Aitchison.*—DISTRIB. Cabul, Beloochistan, Nubia, Socotra.

Branches 6–12 in. *Leaves* 1 by ⅛ in. *Spikes* 1–3 in.; flowers all sessile; bracts scattered, leaflike. *Stigma* a very depressed cone. Hairs on the *fruit* adpressed or thickly bristly.

SECT. VI. **Heliophytum.** Fruit mitriform, subacutely 4-pointed.

16. **H. indicum**, *Linn.*; *Roxb. Fl. Ind.* i. 454; herbaceous, leaves petioled ovate subserrate, spikes elongate dense ebracteate, fruit separating into two 2-seeded 2-pointed pyrenes. *Bot. Mag.* t. 1837. H. anisophyllum, *Beauv. Fl. Ow. et Ben.* ii. 62, t. 96. Tiaridium indicum, *Lehm. Asperifol.* 14; *Wall. Cat.* 913; *Wight Ill.* t. 171; *Chamisso in Linnæa*, 1829, 452, t. 5, fig. 2; *Dalz. & Gibs. Bomb. Fl.* 172. T. anisophyllum, *G. Don Gen. Syst.* iv. 364. Heliophytum indicum, *DC. Prodr.* ix. 556; *Fresen. in Mart. Fl. Bras. fasc.* 22, 48, t. 10, fig. 4. H. velutinum, *DC. l. c.* 557.

Throughout INDIA; very common in the moister parts.—DISTRIB. Malaya, E. Asia, Tropical Africa and America.

Annual, hirsute. *Stems* 6–18 in. *Leaves* alternate or subopposite, 1–4 in., more or less woolly. *Spikes* 1–8 in., mostly leaf-opposed. *Sepals* $\frac{1}{16}$–$\frac{1}{12}$ in., linear. *Corolla-tube* $\frac{1}{8}$ in., narrow-cylindric; lobes small, round, crenate. *Stigma* conoid-linear. *Fruit* $\frac{1}{6}$ in., ovoid, ribbed, soon separating into 2 mitrelike pyrenes; each pyrene with 2 cavities in addition to the seed-bearing cells.

DOUBTFUL SPECIES.

H. ROXBURGHII, *Spreng. Syst. curæ post.* 54; erect, ramous, hairy, leaves petioled ovate-oblong, spikes terminal panicled secund, tube of the corolla long and gibbous. *DC. Prodr.* ix. 549. H. paniculatum, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 2, *not of R. Br.*—CHITTAGONG, *Roxburgh.* Known only from Roxburgh's description. Possibly, as Roxburgh did not live to publish his own mss., this was his first description of *Tournefortia Roxburghii* (afterwards described fully under *Lithospermum*), which he may have preserved for reference. This explanation applies certainly to some duplicate species in Roxburgh's posthumous work. It can hardly be *H. zeylanicum*, Lamk. (as Rottler supposed) because that species is not known in Chittagong.

7. TRICHODESMA, *Br.*

Coarse, hispid herbs. *Leaves* opposite, upper alternate, entire. *Pedicels* axillary, 1-flowered, going off into terminal racemes by the gradual reduction of the floral leaves. *Calyx* deeply 5-merous; lobes triangular-lanceolate, in fruit enlarged. *Corolla-tube* campanulate-cylindric, throat without scales; lobes 5, twisted to the left, a gland or depression near the base of each. *Stamens* 5, filaments short; anthers elongate, lanceolate, connivent in a cone; connectives more or less hairy on the back, tips excurrent at length twisted. *Ovary* 4-celled; style terminal filiform, stigma small. *Fruit* ellipsoid, sub-4-ridged; nutlets ovoid-oblong, smooth, shining on the back, scabrous, slightly or strongly margined on the inner face, closely adnate by their whole inner face to the carpophore below the style, finally separating.—Species 10; in tropical and warm-temperate Africa, Asia, and Australia.

* *Calyx-lobes in fruit cordate or hastate at the base.*

1. **T. indicum**, *Br. Prodr.* 496; bristly with hairs springing from tubercles and also more or less villous, leaves mostly sessile lanceolate or cordate-lanceolate, calyx-lobes (at least in fruit) cordate or hastate at the base, staminal cone densely closely woolly on the back. *Wall. Cat.* 932; *Wight Ill.* t. 172; *DC. Prodr.* x. 172; *Dalz. & Gibs. Bomb. Fl.* 173; *Boiss. Fl. Orient.* iv. 280. T. perfoliatum, *Wall. Cat.* 934. T. hirsutum, *Edgew. Pl. Banda*, 51. Borago indica, *Linn.*; *Roxb. Fl. Ind.* i. 458. ? B. spinulosa, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 11; *DC. Prodr.* x. 35.

Throughout INDIA; common; not in Bengal Plain.—DISTRIB. Cabul, Beloochistan, Persia, Mauritius.

Erect or diffuse. *Leaves* 1–4 in., tuberculate on the upper surface. Lower *pedicels* often distinctly axillary, 1-flowered. *Calyx-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in., more or less grey- or white-villous. *Corolla-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{3}$ in., ovate, suddenly acuminate. *Nutlets* $\frac{1}{8}$ in., sometimes very rough on the inner face, obscurely margined.—Edgeworth notes that *Borago spinulosa* is *Trichodesma indicum*, probably correctly; no one appears to have seen a specimen or to know what else it can be.

VAR. *subsessilis*; leaves subelliptic narrowed downwards many very shortly petioled. T. subsessilis, *Wall. Cat.* 933.—British Burma; Prome, *Wallich*; Pegu, *Kurz.*

2. **T. amplexicaule**, *Roth Nov. Sp.* 104; bristly with hairs springing from tubercles, hardly at all villous, leaves sessile cordate-oblong beneath strigose

on the nerves otherwise glabrous, flowers and fruit nearly as of *T. indicum. DC. Prodr.* x. 172; *Dalz. & Gibs. Bomb. Fl.* 173. T. inæquale, *Edgew. Pl. Banda,* 51.

Throughout W. INDIA; from Scinde, Rajpootana, and Central India to Malabar; frequent.

Probably a mere form of *T. indicum. Corolla-lobes* ovate, suddenly acute, twisted to the left in the bud. *Anthers* exsert, tips of the connective finally twisted.

3. **T. africanum,** *Br. Prodr.* 496; bristly with hairs springing from tubercles, leaves ovate-oblong lower long-petioled, calyx-lobes in fruit cordate at the base, staminal cone laxly hairy on the back. *DC. Prodr.* x. 173; *Boiss. Fl. Orient.* iv. 280. Borago africana, *Linn. Sp. Pl.* 197. B. verrucosa, *Forsk. Fl. Æg-Arab.* 41.

PUNJAB and SCINDE; *Aitchison, Stocks,* &c.—DISTRIB. Cabul, Persia, Arabia, Tropical Africa to Senegal.

Stem and leaves as of *T. indicum,* but more harshly hispid. *Racemes* mostly lateral, often bipartite and subebracteate. *Calyx-lobes* $\frac{1}{4}$ in., in fruit $\frac{1}{2}$–$\frac{2}{3}$ in. *Corolla tube* $\frac{1}{5}$ in.; lobes $\frac{1}{4}$ in., ovate, acute. *Nutlets* $\frac{1}{6}$ in.; margin prominent, glochidiate.

** *Calyx-lobes in fruit ovate or rounded at the base.*

4. **T. zeylanicum**, *Br. Prodr.* 496; leaves oblong obtuse or acute at the base hairy beneath, racemes lateral and terminal, nutlets $\frac{1}{6}$ in. ovoid-oblong obscurely margined. *Wall. Cat.* 935; *DC. Prodr.* x. 172; *Bot. Mag.* t. 4820; *Benth. Fl. Austral.* iv. 404. Borago zeylanica, *Linn. Mant.* 202; *Jacq. Ic. Pl. Rar.* ii. t. 314; *Burm. Fl. Ind.* 41, t. 14, fig. 2. Leiocarya Kotschyana, *Hochst. in Flora,* 1844, 30.

DECCAN PENINSULA and CEYLON: common.—DISTRIB. Malaya, Australia, Mascarene Islands.

Habit of *T. indicum. Leaves* sessile or subpetiolate, bristly with hairs springing from tubercles on the upper surface. *Racemes* usually denser, more softly villous than in *T. indicum. Flowers* and fruit about the same size as in *T. indicum.*

5. **T. khasianum**, *Clarke*; very large, leaves elliptic narrowed at both ends or petioled sparsely hairy beneath, racemes forming large terminal corymbs, nutlets $\frac{1}{4}$ in. widely margined.

KHASIA; *Griffith* (Kew Distrib. n. 5989), &c.

Apparently a stout, sparingly setose, shrub. *Leaves* 7 by $2\frac{1}{2}$ in., mostly opposite, petioled, scabrous tuberculate above, rugose subglabrate beneath. *Corymbs* with 50–100 flowers, nearly ebracteate. *Calyx-lobes* in the bud $\frac{2}{3}$ by $\frac{1}{5}$ in., rusty-pubescent, in fruit 1 by $\frac{2}{3}$ in., papery. *Corolla-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{3}$ in., lanceolate-linear. *Anther-cone* nearly $\frac{1}{2}$ in., patently white-hairy.—Remote in habit from the other Indian species; a still larger species has lately been discovered by Dr. Balfour in Socotra.

8. ACTINOCARYA, *Benth.*

A slender, diffuse herb, sparsely strigose or nearly glabrous. *Leaves* alternate, obovate-oblong, entire. *Flowers* minute, solitary on axillary pedicels. *Calyx* deeply 5-lobed, hardly enlarged in fruit. *Corolla-tube* short; scales in the throat 5, very small; lobes 5, obtuse, spreading, imbricate in the bud. *Stamens* 5, filaments short; anthers small, ovate, obtuse. *Ovary* deeply 4-lobed; style short, from the base of the lobes, stigma small. *Nutlets* 4, obovoid-oblong, divaricate, with small spines on all sides, attached to the small carpophore only at their minute lower ends.

A. tibetica; *Benth. in Gen. Pl.* ii. 846.

WESTERN TIBET; Nubra, alt. 13,000 ft.; near Karsar village, *Thomson.*

Stems 4–14 in., prostrate, branched. *Leaves* $\frac{3}{4}$ by $\frac{1}{6}$ in., subobtuse. *Pedicels* $\frac{1}{4}$–$1\frac{1}{4}$ in. *Sepals* $\frac{1}{16}$ in., narrowly oblong. *Corolla-tube* scarcely longer than the sepals; lobes $\frac{1}{30}$ in. *Nutlets* $\frac{1}{16}$ in.

9. OMPHALODES, *Moench.*

Weak, decumbent herbs, strigose or subglabrous. Radical *leaves* long-petioled, lanceolate or ovate; cauline few, alternate. *Pedicels* in lax racemes, slender, lower subaxillary solitary from leaf-like bracts. *Flowers* white or blue. *Sepals* 5, spreading, little enlarged in fruit. *Corolla* rotate, throat almost closed by obtuse scales; lobes 5, round, spreading, imbricate in the bud. *Stamens* 5, included; anthers small, obtuse. *Ovary* deeply 4-lobed; style filiform, from the base of the lobes, stigma small or subcapitate. *Nutlets* 4, depressed, forming a pyramid, attached to the small carpophore by their inner faces, their margins broad thin, entire or serrate, reflexed over the back of the nuts so as to form on each a small nearly closed cell opening outwards by a small hole; nuts smooth on the back.—Species 10; from the Mediterranean basin to Central Asia and Japan.

O. Thomsoni, *Clarke*; leaves elliptic or oblong subobtuse strigose on both surfaces, racemes lax subterminal, revolute margins of the nutlets nearly entire. Omphalodes, sp. 8, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET: Nubra, alt. 13,000 ft., *Thomson.*

Rootstock perennial; annual branches 6–10 in., very numerous, slender, strigose. *Radical leaves* 1 by $\frac{1}{4}$ in., spathulate; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in.; cauline $\frac{3}{4}$ by $\frac{1}{3}$ in., sessile. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in., recurved in fruit. *Sepals* $\frac{1}{10}$ in., oblong, reflexed in fruit. *Fruit* $\frac{1}{5}$ in. long and broad, exactly pyramidal; nutlets somewhat saccate at base, appearing inflated by the reflexed loose membranous margin.

10. CYNOGLOSSUM, *Linn.*

Biennial or perennial herbs, erect, hairy. *Leaves* alternate, radical petioled. *Racemes* elongate, ebracteate; flowers ultimately distant, sessile or lower shortly pedicelled, blueish or purple. *Calyx* deeply 5-lobed, in fruit spreading not (or slightly) enlarged. *Corolla-tube* short, with 5 obtuse or emarginate scales in the throat; lobes 5, obtuse, imbricate in the bud. *Stamens* 5, included beneath the scales; anthers small, ovate, their tips hardly above the mouth of the corolla-tube. *Ovary-lobes* 4; style short or longish from the base of the lobes, stigma small. *Nutlets* 4, forming a much depressed pyramid, apices hardly produced above the hilum, bases rounded produced downwards, outer faces convex or flattened, with or without a margin, glochidiate; carpophore (after the nuts have fallen) linear, shortly conic at the base (elongate-conic in *C. Ritchiei* and sometimes in *C. denticulatum, var. zeylanica.*—Species 60; in subtropical and temperate, especially mountain regions.

* *Flowers very small; style neither in flower nor in fruit exceeding $\frac{1}{8}$ in.*

1. **C. furcatum**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 6, and *Cat.* 919; depressed-strigose, upper cauline leaves oblong sessile entire softly hairy, racemes furcate branches long fulvous towards the tips, lower flowers distinctly pedicelled, outer faces of the nutlets ovate distinctly margined by the confluence of the bases of the marginal glochidia. *Don Prodr.* 100; *DC. Prodr.* x. 149; *Maxim. in Bull. Acad. Petersb.* xvii. 554. C. ovatum, *Moon Cat.* 12.

Throughout INDIA and CEYLON; in the mountains, alt. 4–9000 ft., very common; no examples from the Malay Peninsula.—DISTRIB. Cabul.

Erect, 1–3 ft., no patent or lax hairs on the stem. Radical *leaves* larger, long-petioled, persistent at the time of flowering; cauline 4 by 1 in., acute, frequently subdecurrent, glabrous or very minutely but scarcely scabrous on the upper surface, nerves beneath often prominent. Lower *pedicels* often $\frac{1}{10}$–$\frac{1}{4}$ in. *Calyx-lobes* ovate, in fruit often $\frac{1}{8}$ in. broadly oblong. Outer face of the *nutlets* $\frac{1}{8}$ in., with no distinct medial line, with scattered glochidia often not much shorter than the marginal: carpophore linear, hardly conical at the base.—Generally distinguished correctly from the other closely allied species of this subsection by its almost silky indumentum and tawny young racemes. *C. ovatum*, Moon, is a form common in the Nilgherries with shorter, ovate, thicker, more softly hairy leaves.

VAR. *lanceolata*; leaves thinner margin obscurely crenulate upper surface subscabrous with longer hairs rising from a more tuberculate base. C. lanceolata, Heyne; *Wall. Cat.* 921. C. Heynei, *G. Don Gen. Syst.* iv. 354; *DC. Prodr.* x. 150. —Nilgherries, Anamallays, and Mts. of Ceylon, frequent.—Stem with subpatent hairs; cauline leaves narrowed at the base, sometimes obscurely petioled, margin minutely scabrous, in these respects approaching *C. micranthum*, but the fruit is altogether as of *C. furcatum*.

2. **C. micranthum**, *Desf. Cat. Hort. Par.* 1804, 220, *fide A. DC. Prodr.* x. 149; patently hairy, upper cauline leaves lanceolate acute at both ends crenulate, racemes divaricately forked lower flowers subsessile, calyx-lobes minute ovate obtuse, outer faces of the small nutlets shortly ovate not (or most obscurely) margined glochidiate on all sides. *Maxim. in Bull. Acad. Petersb.* xvii. 555. C. canescens, *Willd. Enum. Hort. Berol.* 180; *Benth. in Royle Ill.* 306; *Wall. Cat.* 918, *partly.* C. vesiculosum, *Wall. Cat.* 920, *partly.*

NORTHERN INDIA and the HIMALAYA, alt. 1–8000 ft., from Kashmir to Bhotan and Pegu, common.

Stem 1–4 feet, erect, hirsute. Radical *leaves* none at the time of flowering; upper cauline 3 by $\frac{1}{2}$ in., uppermost often very narrow, margin ciliate sometimes subdenticulate, upper surface scabrous with hairs from tuberculate bases. *Racemes* rigid, often imbricate; flowers very small, sessile in the typical form (lower pedicelled in Wallich's examples). *Calyx-lobes* $\frac{1}{24}$ in. in fruit, obtuse from the first. *Corolla* very small, white, the scales in the throat blue-black. *Nutlets* $\frac{1}{20}$ in., ovoid, in the typical form, sometimes rather larger; carpophore cylindric-linear; style often twice as long as the nutlets.

3. **C. lanceolatum**, *Forsk. Fl. Æg.* 41, *not of Heyne*; hispid, leaves broadly lanceolate strongly nerved beneath, racemes often long with all the flowers pedicelled, nutlets $\frac{1}{8}$ in. diam. shortly ovate not (or most obscurely) margined glochidiate on all sides. *DC. Prodr.* x. 155. C. racemosum, *Roxb. Hort. Beng.* 13, and *Fl. Ind. ed. Carey & Wall.* ii. 6. C. hirsutum, *Jacq. Hort. Schoenb.* iv. t. 489, *not of Thunb.* C. micranthum, *Dalz. & Gibs. Bomb. Fl.* 172.

BENGAL PLAIN, to the sea, common; extending throughout the GANGETIC PLAIN to LAHORE. BOMBAY; *Law.*—DISTRIB. Arabia.

Raceme-branches in fruit often 6–10 in.; pedicels often $\frac{1}{4}$ in.; calyx-lobes in fruit $\frac{1}{8}$ in., obtuse.—Roxburgh's *C. racemosum* has been united by all authorities with *C. micranthum*, Desf.; the nutlets are larger, the habit coarser; whether species or variety, it is identical with *C. lanceolatum*, Forsk.

4. **C. glochidiatum**, *Wall. Cat.* 922; stem hispid with hairs springing from tubercles, cauline leaves lanceolate base attenuate or petioled ciliate or denticulate, lower flowers of the elongate racemes shortly pedicelled, calyx-lobes ovate obtuse sometimes oblong in fruit, outer faces of the nutlets ovate margined glochidiate on all sides. *DC. Prodr.* x. 150, *as to description only.* C. stellulatum, *Wall. Cat.* 921. C. micranthum, Var. *H. f. & T. in Herb.*

KHASIA MTS. and adjacent parts of ASSAM, alt. 2–6000 ft., frequent; *Wallich, Griffith, H. f. & T.* &c.—DISTRIB. Ava.

Erect, 1–2 feet, branches ascending. *Leaves* 2 by ½ in., thin, sparsely hispid on both surfaces with hairs often rising from tubercles; radical leaves 0 at the time of flowering. *Calyx-lobes* $\frac{1}{12}$ in. in fruit. *Nutlets* $\frac{1}{10}$ in., margined by the confluent bases of the glochidia, but not prominently, glochidia on the faces plentiful and not much shorter; carpophore sublinear.—H. f. & T. appear justified in regarding this plant as allied to *C. micranthum*, rather than to *C. denticulatum*. Both Benth. and DC. say that Wallich's *C. glochidiatum* came from Nepal; but Wallich says he got it at Punduah, i.e. Khasia, where all other collectors get it.

5. **C. denticulatum**, *A. DC. Prodr.* x. 150; stem softly hairy or strigose, leaves ovate- or oblong-lanceolate some cauline petioled ciliate or denticulate, calyx-lobes ovate, outer faces of the nutlets shortly ovate prominently margined glochidiate sparingly on the faces. *G. Don. Gen. Syst.* iv. 354. C. glochidiatum, *Benth. in Royle Ill.* 306; *Lindl. in Bot. Reg.* 1841, t. 15. C. canescens, *Wall. Cat.* 918, *partly.* C. vesiculosum, *Wall. Cat.* 920, *partly.*

TROPICAL and TEMPERATE HIMALAYA, alt. 1–9000 ft., from Kashmir to Sikkim; very common. CENTRAL INDIA from Chota Nagpore to Bombay; very common.—DISTRIB. Cabul, Malaya.

Resembling *C. glochidiatum. Leaves* usually closely clothed on the upper surface with hairs rising from tubercles. *Carpophore* sublinear.—The Central Indian examples have rather larger nutlets than the Himalayan *C. denticulatum*, and are intermediate between that and the Var. *zeylanica.*

VAR. *zeylanica*; nutlets larger their faces sometimes ⅛ in. diam. very strongly margined, base of the carpophore sometimes elongate conic so that the nutlets are attached obliquely. C. zeylanicum, *Thunb.* C. glochidiatum, *Dalz. & Gibs. Bomb. Fl.* 172. Echinospermum zeylanicum, *Lehm. Asperifol.* 116; *Roem. & Sch. Syst.* iv. 780; *DC. Prodr.* x. 142.—W. Deccan Peninsula, from the Concan southwards in the tropical region. Ceylon (fide Lehmann).

6. **C. Wallichii**, *G. Don Gen. Syst.* iv. 354; stem hirsute erect, cauline leaves lanceolate to ovate base narrowed or petioled ciliate or denticulate, calyx-lobes oblong in fruit sometimes elongate narrow, nutlets shortly ovate strongly margined glochidiate sparingly on the faces. *DC. Prodr.* x. 150. C. calycinum, *Wall. Cat.* 923, *not of Meyer.* C. vesiculosum, *Wall. Cat.* 920, *partly.* C. microcarpum, *A. Kerner Nov. Pl. Sp.* ii. 13.—Cynoglossum sp. n. 6, *Herb. Ind. Or. H. f. & T.*

W. TEMPERATE HIMALAYA, alt. 4–11,000 ft, from Kashmir to Kumaon, very common.

Differs from *C. denticulatum* in the narrower calyx-lobes more elongate in fruit; these are ovate-oblong in typical *C. calycinum*, linear-oblong in *C. microcarpum*, A. Kerner; and there is every state between.—Very abundant westward about Dalhousie, when *C. denticulatum* becomes rare; but the two species are very difficult to distinguish, and may not be distinct.

VAR. *alpina*; more hirsute, stems prostrate or decumbent, leaves mostly small more scabrous tuberculate hairy. Cynoglossum sp. n. 7, *Herb. Ind. Or. H. f. & T.* ? C. membranaceum, *A. DC. Prodr.* x. 150.—W. Subalpine Himalaya; *Edgeworth*, &c. Lower cauline *leaves* 1 in., long-petioled, but most of the leaves ½–¾ in., subsessile. No authentic example of *C. membranaceum* seen.

7. **C.? Ritchiei**, *Clarke*; cauline leaves lanceolate narrowed at the base, calyx-teeth in fruit elongate oblong, outer faces of the nutlets ovate marginate strongly glochidiate, carpophore ⅛ in. elongate-conic at base so that the nuts are attached obliquely.

BOMBAY; Belgaum, *Ritchie.*

This closely resembles *C. denticulatum*, var. *zeylanica*, and may be a form of it.

but the carpophore is much dilated at the base; the calyx-segments in fruit $\frac{1}{8}$ by $\frac{1}{10}$ in. This plant is a species of *Paracaryum* according to the "Genera Plantarum," but it cannot well be removed far from *C. denticulatum*, Var. *zeylanica.*

** *Flowers larger* $\frac{1}{4}$–$\frac{1}{2}$ *in. diam., style* $\frac{1}{8}$–$\frac{1}{4}$ *in.*

8. **C. microglochin**, *Benth. in Royle Ill.* 305; cauline leaves numerous subsessile ovate or elliptic acute densely softly hairy beneath, calyx-lobes in fruit $\frac{1}{4}$ in., outer faces of the nutlets $\frac{1}{8}$ in. ovate margined coarsely not densely glochidiate. *DC. Prodr.* x. 151.

TEMPERATE W. HIMALAYA, alt. 7–11,000 ft., from Kashmir to Kumaon frequent; *Royle, Strachey, & Winterbottom,* &c.

Erect $1\frac{1}{2}$–3 feet, hairy. *Leaves* 4 by 2 in., in Royle's type, often narrower, entire, lower attenuated at the base. *Racemes* dense, in fruit 1–4 in.; pedicels short, lower in fruit $\frac{1}{4}$ in. *Calyx-lobes* in flower $\frac{1}{6}$ by $\frac{1}{10}$ in., elliptic, obtuse, villous. *Corolla-tube* shorter than the calyx-lobes, segments $\frac{1}{8}$ in. *Anther-cells* oblong, divaricate at the base, tips shortly emergent above the corolla-throat, covered by the depressed cone of scales. *Nutlets* with very stout glochidia; carpophore conic, style $\frac{1}{4}$ in.

9. **C. nervosum**, *Benth. ms.*; cauline leaves numerous subsessile elliptic or oblong acute sparsely hirsute on both surfaces, calyx-lobes in fruit $\frac{1}{4}$ in., outer faces of the nutlets $\frac{1}{8}$ in. ovate marginate densely glochidiate. Omphalodes nervosa, *Edgew. ms.*

WESTERN HIMALAYA; Kulu, Jalauri Pass, *Edgeworth*; Pangee, alt. 12,000 ft., *Dr. Watt.*

Generally resembling *C. microglochin*, but with laxer racemes, larger flowers, and different indumentum. Cauline *leaves* 4 by $1\frac{1}{4}$ in., hairs on the upper surface from tubercles, on the lower lax; nerves not prominent. *Racemes* 1–6 in., lax; lower pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla* $\frac{2}{3}$ in. diam., widely campanulate, tube very short. *Nutlets* not fully ripe, much more closely glochidiate than in *C. microglochin*; carpophore shortly conical at the base, style $\frac{1}{4}$ in.

10. **C. petiolatum**, *A. DC. Prodr.* x. 149; cauline leaves few ovate acute minutely softly hairy beneath, calyx-lobes in fruit $\frac{1}{6}$ in., outer faces of the nutlets $\frac{1}{6}$ in. ovate marginate sparsely glochidiate. Anchusa petiolata, *Hook. Bot. Mag.* t. 3858.

ALPINE WESTERN HIMALAYA; Zanskar, near Umasi Pass, *T. Thomson.*

Erect, 2–3 feet, hairy. Lower *leaves* oblong, long-petioled; petiole of the radical leaves 5 in. *Racemes* straggling, branched, 4–8 in. in fruit; pedicels very short, lower scarcely $\frac{1}{4}$ in. *Calyx-lobes* in flower $\frac{1}{8}$ in., elliptic, obtuse, hairy. *Corolla* $\frac{1}{3}$ in. diam., tube hardly longer than the calyx. *Nutlets* as of *Cynoglossum*, faces but little glochidiate except on the margins.—Flowers intermediate in size between those of the two last species and those of *C. furcatum*, &c. No authentic example of *C. petiolatum* has been seen; and Thomson's examples are referred to that species, only because Bot. Mag. t. 3858, closely resembles them; the leaves in Thomson's plant here described are hairy on both surfaces, in the picture they appear glabrous, ciliate on the margin only.

DOUBTFUL SPECIES.

C. EDGEWORTHII, *A. DC. Prodr.* x. 150; stem erect hispid below, leaves ovate-oblong narrowed at both ends adpressedly hairy, calyx-lobes ovate obtuse short, nutlets ovate glochidiate on all sides.

HIMALAYA; alt. 4–6000 ft., *Edgeworth.*

Differs from *C. micranthum* by the flowers twice as large, the corolla longer towards (? in proportion to) the calyx, the leaves seldom subdenticulate.

11. LINDELOFIA, *Lehm.*

An erect, perennial, hairy herb. Radical *leaves* petiolate; cauline alternate, from ovate to linear-lanceolate. *Racemes* dense, elongate, ebracteate. *Flowers* blue, purple, or nearly black. *Sepals* in fruit somewhat enlarged, spreading. *Corolla-tube* cylindric, longer than the calyx, crowned with scales in the throat forming a cone; lobes obtuse, round, spreading, horizontally imbricated in bud. *Stamens* 5; anthers large, linear--oblong, exserted, but scarcely overtopping the scales. *Ovary* 4-lobed; style from near the base of the lobes, long, stigma small. *Nutlets* 4, depressed, rounded at the base, apices hardly produced, glochidiate; carpophore short.

L. spectabilis, *Lehm. in Linnæa,* xxiv. 216; hairy, cauline leaves sessile oblong, corolla-tube 1–3 times as long as the calyx, faces of the nutlets glochidiate on the margin chiefly. Cynoglossum longiflorum, *Benth. in Royle Ill.* 305; *Bot. Reg.* 26, t. 50. C. grandiflorum, *Benth. in Royle Ill.* 305; *DC. Prodr.* x. 156. Omphalodes longiflora, *A. DC. Prodr.* x. 158. Anchusopsis longiflora, *Bisch. in Linnæa,* xxxvi. 736.

ALPINE WESTERN HIMALAYA; alt. 10–12,000 ft., from Gurwhal to Kashmir, *Royle, Madden, Falconer,* &c.

Stem 1–2 ft., patently, sometimes densely hairy. Radical *leaves* long-petioled, 2–4 in., lanceolate; lower cauline petioled, upper subcordate, amplexicaul, 3 in., hirsute more or less on both surfaces. *Racemes* dense, even in fruit, or elongate lax. *Calyx-lobes* in flower $\frac{1}{5}$ in., subacute, in the type example, sometimes obtuse, variable in length, sparingly pilose or woolly. *Corolla* intense blue, tube $\frac{1}{4}$ in., lobes $\frac{1}{5}$ in. in the type example, excessively variable in size. Outer faces of the *nutlets* $\frac{1}{6}$–$\frac{1}{5}$ in., ovate, marginal glochidia connate at the base, the obscure medial line sparingly glochidiate, the rest of the surface nearly smooth; in a word, as of *Cynoglossum*; carpophore sublinear.—Hardly any two examples agree in the size and shape of the corolla and calyx or in their relative sizes.

VAR. *Falconeri*; stems strict, leaves linear-lanceolate, calyx-lobes $\frac{1}{5}$ in. narrowly oblong, corolla-tube $\frac{1}{2}$–$\frac{2}{3}$ in.—Kashmir, *Falconer.*

VAR. *Levingii*; leaves elliptic and ovate acute, calyx-lobes $\frac{1}{4}$–$\frac{1}{3}$ in. ovate, corolla-tube $\frac{2}{3}$ by $\frac{1}{4}$ in., segments $\frac{1}{3}$ in. diam. orbicular, style $\frac{3}{4}$ in.—Kashmir; Pir Pingul, alt. 11,500 ft., *Levinge.* This has much larger flowers than any other example.

2. **L. Benthami,** *Hook f.*; hairy, leaves linear-lanceolate acute, racemes panicled, corolla-tube about equalling the calyx narrow, segments elliptic or oblong suberect. Solenanthus sp. 3, *Herb. Ind. Or. H. f. & T.*

KASHMIR and WESTERN TIBET; alt, 11–15,000 ft., *Thomson, Strachey & Winterbottom,* &c.

Stems 2–3 ft., erect. *Radical leaves* long-petioled, narrow-lanceolate, cauline sessile 4 by $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicles* repeatedly branched, laxly racemose; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. and upwards. *Calyx-lobes* at flower-time nearly $\frac{1}{3}$ by $\frac{1}{8}$ in., narrowly lanceolate, acute. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$ in., cylindric; lobes $\frac{1}{8}$ by $\frac{1}{16}$ in., erect or only half-patent. *Filaments* as long as the scales; anthers exserted (not from the corolla). *Style* $\frac{1}{2}$–$\frac{3}{4}$ in. *Nutlets* $\frac{1}{4}$–$\frac{1}{3}$ in., forming a pyramid, densely shortly glochidiate, especially round the margins; carpophore elongate conic.—This may prove to be S. angustifolius, *Fisch. & Mey.*; *DC. Prodr.* x. 165; it was placed in *Lindelofia* by Bentham, (to which genus I would refer the *Solenanthi* with long anthers, as *S. lanatus,* A. Dc., *S. brachtystemon,* F. & M.—*J. D. Hooker*).

12. SOLENANTHUS, *Ledeb.*

Perennial, hairy herbs. *Leaves* alternate, radical petioled. *Racemes* dense or corymbose, ebracteate. *Calyx* 5-partite, scarcely enlarged in fruit. *Corolla*

tubular, throat with 5 scales; lobes 5, small, obtuse, erect or scarcely spreading. *Filaments* long; anthers small, shortly oblong, far exserted. *Ovary* 4-lobed; style from the base of the lobes, filiform, stigma small. *Nutlets* 4, attached somewhat obliquely to the conical carpophore, scarcely produced at the apex, rounded at the base, muricate or shortly glochidiate, usually margined.—Species 10, in S. Europe, Central and W. Asia.

1. **S. circinnatus,** *Ledeb. Fl. Alt.* i. 194, and *Ic. Fl. Ross.* t. 26; radical leaves long-petioled cordate submembranous cauline subamplexicaul oblong-lanceolate, racemes forming a terminal panicle *DC. Prodr.* x. 164; *Boiss. Fl. Orient.* iv. 270.

ALPINE WESTERN HIMALAYA; Zanskar, *Thomson*; Pangee, *Dr. Watt.*—DISTRIB. Affghanistan, Astrabad, Soongaria, Altai.

Stems 3 ft., erect, laxly hairy. *Radical leaves* 6 by $2\frac{3}{4}$ in.; petiole 8 in.; cauline 3 by $1\frac{1}{4}$ in. *Panicle* in fruit 10 by 8 in., branches elongate; flowers approximate; pedicels 0–$\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{5}$ by $\frac{1}{12}$ in., oblong. *Corolla-tube* $\frac{1}{4}$ in., lobes $\frac{1}{10}$ in. *Filaments* $\frac{1}{4}$ in. *Style* $\frac{1}{4}$–$\frac{1}{3}$ in. *Nutlets* forming a pyramid $\frac{1}{4}$–$\frac{1}{3}$ in. diam., densely shortly glochidiate, especially round the margins; carpophore elongate-conic.

13. PARACARYUM, *Boiss.*

Perennial or biennial, hairy herbs. *Leaves* alternate. *Racemes* elongate, bracts few or 0. *Flowers* small, blue. *Calyx* deeply 5-fid, in fruit not much enlarged. *Corolla* funnel-shaped, or cylindric in *P. heliocarpum*, tube closed by 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, beneath the scales. *Ovary* 4-lobed; style from the base of the lobes, short or long, stigma small. *Nutlets* 4, depressed, often broadly adnate to the carpophore with rigid persistent style, forming a pyramid, their apices hardly produced, their bases rounded, attached obliquely to the elongate conical carpophore, glochidiate (except in *P. ? Lambertianum*), strongly margined; margin sometimes much reflexed as in *Omphalodes.*—Species 20, in S. Europe, W. and Central Asia.

SECT. I. *Stem* solitary, tall, corymbose upwards. *Leaves* large.—(This section differs from *Cynoglossum microglochin, petiolatum,* &c., only in the more elongate conic carpophore, the nutlets being obliquely suberect, rather than much depressed and subdivaricate as in *Cynoglossum.*)

1. **P. cœlestinum,** *Benth. in Gen. Pl.* ii. 850; radical leaves ovate-cordate submembranous cauline ovate base cuneate strigose on the nerves beneath, racemes divaricate furcate, pedicels very short. Cynoglossum cœlestinum, *Lindl. in Bot. Reg.* 1839, t. 36; *DC. Prodr.* x. 151; *Dalz. & Gibs. Bomb. Fl.* 173. Echinospermum cœlestinum, *Wight Ic.* t. 1394.

WESTERN DECCAN PENINSULA; from Mahableshwur to Mysore, common, *Wight, Dalzell,* &c.

Erect, 3–4 ft., sparsely hairy. *Radical leaves* long-petioled, 7 by 5 in.; cauline $3\frac{1}{2}$ by 2 in., acute, subentire, tubercular-scabrous above, nearly glabrous beneath except on the nerves. *Racemes* strigose; branches 2–4 in.; pedicels $\frac{1}{8}$ in., approximate. *Calyx-lobes* $\frac{1}{10}$ in., elliptic; in fruit $\frac{1}{8}$ in., ovate. *Flowers* $\frac{1}{3}$ in. diam., nearly as of *Cynoglossum.* *Style* scarcely $\frac{1}{8}$ in. Outer faces of the *nutlets* $\frac{1}{5}$ in., ovate, margin prominent reflexed strongly glochidiate, disc nearly smooth shining.

2. **P. malabaricum,** *Clarke*; radical leaves ovate-cordate tuberculate-hispid, cauline ovate cuneate at the base hirsute, racemes numerous erect

forming a large dense corymb, pedicels very short. Cynoglossum sp. 13, *Herb. Ind. Or. H. f. & T.*

WESTERN DECCAN PENINSULA; Canara and Mysore, *Law.*

Resembling the preceding species but stouter, more hairy, with larger flowers and fruits. *Calyx-lobes* $\frac{1}{6}$ in., elliptic; in fruit $\frac{1}{4}$ in., ovate. *Nutlets* more than $\frac{1}{4}$ in. diam., subglobose, disc of their faces glochidiate, style $\frac{1}{4}$ in.

3. ? **P. Lambertianum,** *Clarke*; strigose, cauline leaves subsessile ovate acute, racemes long forked, pedicels very short, nutlets large margined not glochidiate.

BOMBAY (*Herb. Lambert*).

The upper portions of 2 fruiting stems of this are very like *P. cælestinum*, but the fruits are totally different. *Calyx* as of *P. cælestinum. Corolla* not seen. *Nutlets* $\frac{1}{3}$ in. diam., ovate, much depressed flattened, margin $\frac{1}{12}$ in. broad, entire, not reflexed, disc smooth, shining; carpophore elongate conic, style ultimately $\frac{1}{5}$ in.—The genus of this plant is very doubtful; the nutlets approach those of *Rindera.*

4. **P. heliocarpum,** *A. Kerner Nov. Pl. Sp.* ii. 9; radical leaves spathulate-lanceolate, cauline oblong or lanceolate softly hairy on both surfaces, racemes long lax flowers pedicelled, corolla-tube elongate much exceeding the calyx, margin of the nutlets broad membranous white reflexed with lanceolate glochidia disc slightly muricated. Cynoglossum anchusoides, *Lindl. in Bot. Reg.* 1842, t. 14; *DC. Prodr.* x. 151. Cynoglossum Emodi, *Schottws Cat. Hort. Copenhagen.* Lindelofia anchusoides, *Lehm. in Linnæa,* 1851, 216.

TEMPERATE WESTERN HIMALAYA, alt. 7–9000 ft.; Kashmir, Lahul and Piti, *Thomson,* &c.—DISTRIB. Kashgar.

Erect, 3 ft., softly hairy. *Radical leaves* long-petioled, 6 by 1 in.; cauline $2\frac{1}{2}$ by $\frac{1}{2}$ in., closely hairy on both surfaces. *Racemes* 4–10 in., ebracteate; pedicels in fruit $\frac{1}{4}$–$\frac{1}{2}$ in., distant. *Calyx-lobes* $\frac{1}{6}$ in., narrowly oblong, silky; in fruit $\frac{1}{4}$ in. or more, widened. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in., suberect. *Anthers* linear, included. *Style* $\frac{1}{2}$ in. in fruit. *Nutlets* $\frac{1}{4}$–$\frac{1}{3}$ in.; glochidia broadly-lanceolate, thin, membranous.—A plant frequently collected in Cabul by Griffith has been named *P. anchusoides,* but it has very stiffly glochidiate, smaller, less margined nuts; and may be *Cynoglossum macrostylum,* Bunge (cf. Boiss. Fl. Orient. iv. 266).

5. **P. glochidiatum,** *Benth. in Gen. Pl.* ii. 850; radical leaves cordate-ovate, cauline ovate acute hairy on the nerves beneath, racemes elongate furcate lax, margins of the nutlets prominent long-glochidiate. Rindera glochidiata, *Wall. Cat.* 926. Cynoglossum uncinatum, *Benth. in Royle Ill.* 305. C. Roylei, *Wall. Cat.* 917; *DC. Prodr.* x. 155. C. laxum, *G. Don Gen. Syst.* iv. 356. Echinoglossum glochidiatum, *A. DC. Prodr.* x. 136.

ALPINE HIMALAYA, alt. 9–12,000 ft.; from Kashmir to Sikkim, frequent, *Wallich, Royle, J. D. H.,* &c.

Stem 3 ft., laxly hairy. *Radical leaves* 2–4 in. diam., petioles often 6 in.; cauline leaves mostly distinctly petioled, orbicular to elliptic-lanceolate, base obtuse. *Racemes* 2–6 in., strigose; pedicels in fruit often $\frac{1}{4}$–$\frac{1}{2}$ in. distant. *Calyx-lobes* $\frac{1}{8}$ in., oblong, acute; in fruit $\frac{1}{4}$ in., ovate. *Corolla* $\frac{1}{3}$ in. diam., tube short, much as of *Cynoglossum. Style* $\frac{1}{8}$ in. *Nutlets* forming a pyramid $\frac{1}{3}$–$\frac{1}{2}$ in. diam., much adnate to the carpophore; glochidia $\frac{1}{8}$–$\frac{1}{4}$ in., sublinear.

6. **P. Thomsoni,** *Clarke*; radical leaves ovate-oblong, cauline mostly petioled ovate-lanceolate sparsely hairy, racemes divaricate, pedicels very short, nutlets less than $\frac{1}{5}$ in. glochidiate margined.—Echinospermum sp. 2, *Herb. Ind. Or. H. f. & T.*

ALPINE WESTERN TIBET; Nubra, Baltal, *Thomson.*

Stem 3 ft., sparsely hairy. *Radical leaves* 8 by 4 in., blade decurrent on the 4–10 in.

petiole; cauline leaves 3 by $1\frac{1}{4}$ in., cuneate or rhomboid at the base. *Spikes* dense or lax. *Calyx* and *corolla* nearly as of *P. glochidiatum*. *Nutlets* much smaller, margin shorter, white, membranous, less reflexed, more shortly glochidiate.

SECT. 2. Small hispid plants, with several stems. *Leaves* and *flowers* small.—(This section only differs from *Omphalodes* in the more erect nutlets, not saccate at the base.)

7. **P. himalayense,** *Clarke*; leaves oblong, flowers subsessile, nutlets $\frac{1}{4}$–$\frac{1}{3}$ in. diam., margin subpatent glochidiate. Mattia himalayensis, *Klotzsch in Reis. Pr. Waldem. Bot.* 94, t. 64.—Omphalodes sp. n. 4, *Herb. Ind. Or. H. f. & T.*

ALPINE WESTERN HIMALAYA; Nubra, *Thomson*.

Stems decumbent then ascending, 6–14 in., patently hispid. *Radical leaves* $1\frac{1}{2}$ by $\frac{1}{3}$ in., narrowed at both ends, hispid on both surfaces, petiole 1 in.; cauline similar, smaller, subsessile. *Spikes* in fruit 3–8 in.; pedicels hardly any, distant. *Calyx-lobes* hardly $\frac{1}{20}$ in., oblong; in fruit sometimes $\frac{1}{5}$ in. *Corolla* scarcely $\frac{1}{3}$ in. diam., blue, tube short. *Fruit* pyramidal; margin of nutlets membranous, disc muricate, subglochidiate; style hardly $\frac{1}{8}$ in.

8. **P. tibeticum,** *Clarke*; leaves oblong, flowers subsessile or lower pedicelled, nutlets $\frac{1}{6}$–$\frac{1}{5}$ in. diam., margin patent subentire.—Omphalodes sp. n. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Ladakh, alt. 9000 ft., *Thomson*.

Much resembling *P. himalayense*. *Stems* more diffuse. *Flowers* very small, mostly subsessile; lower pedicels in fruit occasionally $\frac{1}{4}$ in. *Fruit* pyramidal; margin of nutlets membranous, disc minutely glochidiate, style less than $\frac{1}{10}$ in.

9. **P. microcarpum,** *Boiss. Diagn.* 2. iii. 139, and *Fl. Orient.* iv. 255; leaves oblong, flowers pedicelled, nuts $\frac{1}{16}$–$\frac{1}{12}$ in., margin inflexed entire.—Omphalodes sp. n. 7, *Herb. Ind. Or. H. f. & T.*

SUBALPINE WESTERN HIMALAYA, alt. 8000 ft.; Kashmir and Pangee, *Thomson*.—DISTRIB. Cabul.

Diffuse, hairy. *Racemes* in fruit 3–8 in.; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. *Calyx* and *corolla* rather larger than of the two preceding species. *Fruit* pyramidal, somewhat depressed; margin of nutlets membranous, as though inflated; disc minutely glochidiate.

14. ECHINOSPERMUM, *Swartz.*

Annual or perennial, hispid herbs. *Leaves* alternate, oblong, lanceolate or narrowly obovate. *Flowers* very small, sessile or pedicelled; racemes bracteate, or ebracteate above. *Sepals* 5. *Corolla-tube* short, mouth closed by 5 scales; lobes 5, imbricate in the bud, obtuse, spreading. *Stamens* 5, included. *Anthers* ovate, obtuse. *Ovary* 4-lobed; style between the lobes, short, stigma small capitate. *Nutlets* 4, erect, forming a pyramid, confluent or separable, attached above their base; scar produced to their apex; bases not produced; margins with 1 or 2 rows of strong glochidia; carpophore as long as the nutlets.—Species 20, in the north temperate regions of the old World and in N. America: a few in S. Africa and Australia.

The character in Gen. Pl. (ii. 835) assigned of "apices of the nuts erect, free round the style, more or less prominent," applies only to the glochidiate species of *Eritrichium* placed by Bentham in *Echinospermum*, but here enumerated under *Eritrichium*.

1. **E. minimum,** *Lehm. Asperifol.* 126; patently hispid, leaves linear-oblong, calyx-lobes linear, nutlets elongate-pyramidal confluent. Myosotis

echinophora. *Pallas Voy.* (*ed. Gauthier*), v. 496, t. 16, fig. 2. Rochelia echinophora, *Roem. et. Sch. Syst.* iv. 110, 782. Heterocaryum minimum, *A. DC. Prodr.* x. 144.

KASHMIR; temperate region *Thomson.* PUNJAB; Peshawur, *Vicary.*—DISTRIB. Cabul, Beloochistan to the Ural Mts. and Altai.

A coarser plant with larger flowers and fruits than the other Indian *Echinospermums.* *Stem* 6–12 in., erect, rigid. *Leaves* 1½ by ¼ in., numerous, sometimes somewhat obovate, lower spathulate petioled. *Racemes* in fruit 3–4 in.; pedicels ¼ in., distant, rigid, suberect, often thickened; bracts ½–¾ in., leaflike, often continued to the top of the raceme. *Calyx-lobes* $\frac{1}{5}$–¼ in. *Corolla-tube* ⅛ in., lobes not much over topping the calyx. *Nutlets* $\frac{1}{5}$–¼ in.; margins thickened, with a single row of strong glochidia; backs depressed, smooth or scarcely granular; nutlets inseparably confluent, not rarely 1 or 2 abortive.—Boissier (Fl. Orient. iv. 248) doubts whether *Heterocaryum pachypodum, rigidum,* and *Szovitzianum* (*A. DC. Prodr.* x. 145), are other than forms of this species.

2. **E. barbatum,** *Lehm. Asperifol.* 128; patently hispid, leaves oblong, calyx-lobes oblong, nutlets separable tubercular-scabrous on all sides with 2 rows of short stout glochidia round the margin. *DC. Prodr.* x. 137; *Boiss. Fl. Orient.* iv. 250. Myosotis barbata, *Bieb. Cent. Pl. Rar.* t. 36. Rochelia barbata, *Roem. & Sch. Syst.* iv. 110, 782.

SUBALPINE WESTERN HIMALAYA, alt. 7–12,000 ft.; from Gurwhal to Baltisthan, frequent; *Thomson,* &c.—DISTRIB. from Beloochistan and Cabul to the Ural and Altai.

Erect, 6–18 in. *Leaves* ½–2 in., narrowed at the base, lower petioled. *Racemes* in fruit 2–12 in.; pedicels ⅛–⅙ in., erect; bracts ⅓ in., usually 0 in the upper part of the spike. *Calyx-lobes* $\frac{1}{10}$ in. *Nutlets* $\frac{1}{10}$–⅛ in., forming a compact pyramid, but separable.

3. **E. Redowskii,** *Lehm. Asperifol.* 127; patently hispid, leaves oblong, flowers subsessile, calyx-lobes oblong-linear, nutlets separable scabrous on all sides with one row of strong glochidia round the margin. *DC. Prodr.* x. 137. E. intermedium, *Ledeb. Fl. Alt.* i. 199, and *Ic. Fl. Ross.* ii. t. 180. Rochelia Redowskii, *Roem. & Sch. Syst.* iv. 782.

WESTERN TIBET, alt. 9–10,000 ft.; Leh, *Thomson.*—DISTRIB. Central Asia to the Ural and Altai.

Generally resembling *E. barbatum.* *Pedicels* rarely exceeding ⅛ in.; bracts ½ in., oblong, often continued (smaller) to the summit of the spike. *Calyx-lobes* rather longer than of *E. barbatum,* in fruit ⅙–$\frac{1}{5}$ in. in Thomson's example. *Nutlets* nearly as in *E. barbatum* but the glochidia in one row and much longer.—Perhaps *E. patulum,* Lehm. (*DC. Prodr.* 137; *Boiss Fl. Orient.* iv. 250) is not specifically distinct.

4. **E. semiglabrum,** *Ledeb. Fl. Alt.* i. 204, and *Ic. Fl. Ross.* i. t. 28; patently hispid, leaves oblong, flowers subsessile, calyx-lobes linear-oblong, nutlets tubercular-scabrous on all sides with one row of glochidia round the margin as long as the nutlet is broad. *DC. Prodr.* x. 138; *Boiss. Fl. Orient.* iv. 251.

WESTERN TIBET and BALTISTHAN, alt. 8–10,000 ft.; *Thomson,* &c.—DISTRIB. Cabul; Turkestan to the Altai.

Hardly distinguishable from *E. Redowskii,* but by the longer glochidia of the nuts which often exceed ⅛ in. *Spikes* denser, more divided, often somewhat closely panicled.

15. ERITRICHIUM, *Schrader.*

Annual or perennial herbs, strigose or silky-villous. *Leaves* alternate, narrow. *Racemes* simple or branched. *Flowers* small, blue, rarely white. *Sepals* 5, not or slightly enlarged in fruit. *Corolla-tube* short, throat with 5

scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style between the lobes, short, stigma small capitate. *Nutlets* 4, erect, much longer than the carpophore, scar small below their middle, nearly basal in *E. basifixum,* tips free; margins winged by glochidia confluent at the base or rugose or entire.—Species 70; Europe, Temp. Asia, America; in Australia.

* *Glochidia on the margin of the nutlets confluent at their bases.*

1. **E. strictum,** *Dcne. in Jacquem. Voy. Bot.* 125; perennial, silky-white, leaves linear, bracts minute in the upper part of the raceme, sepals in fruit $\frac{1}{16}$–$\frac{1}{12}$ in. oblong. *A. DC. Prodr.* x. 128. E. Jacquemontii and longifolium, *Dcne. l. c.* 122, 123, tt. 127, 129; *DC. l. c.* 25. Echinospermum canum, *Benth. in Royle Ill.* 306; *A. DC. l. c.* 141. ? E. myosotiflorum, *A. DC. Prodr.* x. 141.

Throughout the WESTERN HIMALAYA, alt. 7–13,000 ft.; common, from Kashmir and Baltisthan to the Sutledge.

Rootstock woody; stems 8 in., numerous, strict, undivided. *Leaves* 1½ by $\frac{1}{8}$ in., softly adpressedly silky; lowest similar but larger, attenuate, hardly petioled; radical withered. *Racemes* 1–3 in., branched; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in., erect in fruit. *Flowers* ¼ in. diam., blue. *Nutlets* forming a pyramid $\frac{1}{12}$–$\frac{1}{10}$ in. high, produced more than half their length above the punctiform scar; margins subreflexed, thin, the weak glochidia produced shortly above their confluence, scabrous, apices of most divided, uncinate; backs scabrous, or muricated with minute prickles.—Decaisne's example here described has narrower leaves than the mass of the material which is half-way between this and var. *Thomsoni.* This is the type of the genus *Echinospermum* as described in the Gen. Pl., and may be *E. myosotiflorum,* A. DC. Prodr. x. 141.

VAR. *Thomsoni;* glistening silky, stems 12–18 in., cauline leaves ¾ by ⅓ in. oblong radical much larger long-petioled, racemes larger with rather larger calyces and fruits, nutlets often pilose.—N. Kashmir, alt. 8000 ft., *Thomson,* &c. A most beautiful plant, perhaps specifically distinct.

VAR. *fruticulosum;* weaker, greener, stems diffuse sometimes with divaricate branches. E. fruticulosum, *Klotzsch in Reis. Pr. Wald. Bot.* 96, t. 62. E. patens, *Dcne. in Jacquem. Voy. Bot.* 125; *DC. Prodr.* x. 128.—W. Himalaya, alt. 8–11,000 ft.; Pangee, Lahoul, Changas; *Thomson,* &c.

2. **E. spathulatum,** *Clarke*; perennial, villous, leaves oblong, bracts minute in the upper part of the raceme, calyx-lobes in fruit $\frac{1}{8}$–$\frac{1}{5}$ in. oblong. Echinospermum spathulatum, *Benth. in Royle Ill.* 306; *DC. Prodr.* x. 142.

WESTERN TIBET; Hangarang Pass, *Thomson*; Kijungar Pass, alt. 16,000 ft., Strachey and Winterbottom.

Rootstock woody. *Stems* 2–6 in., numerous, decumbent. *Cauline leaves* ¾ by ¼ in., sessile; lower numerous, larger, spathulate, petioled. *Nutlets* not ripe, larger than in *E. strictum,* var. *Thomsoni,* hairy on the back.—Perhaps a form of *E. strictum,* but wants the glistening silky indumentum of that species; calyx and nutlets larger.

** *Margins of the nutlets entire or crenulate not glochidiate.*

3. **E. pustulosum,** *Clarke*; weak, diffuse, strigose, leaves spathulate-oblong, pedicels few subaxillary, nutlets ovoid tubercular and minutely pubescent.—Eritrichium sp. n. 14, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM; Lachen, alt. 13–15,000 ft., *J. D. H.*

Rootstock biennial (at least), weak; stems 3–7 in. *Leaves* ¾ by ¼ in., cauline mostly spathulate, petioled, a few uppermost sessile. *Pedicels* ¼–⅓ in. in fruit. *Calyx-lobes* in fruit ⅛ in., elliptic-oblong. *Flowers* ⅕ in. diam., pale blue. *Nutlets* $\frac{1}{16}$–$\frac{1}{12}$ in., not distinctly margined; tubercles appearing as tufts of minute hairs.

4. **E. pygmæum,** *Clarke*; nearly stemless leaves elliptic, pedicels $\frac{1}{3}$ in. appearing umbelled, nutlets ovoid nearly smooth.—Eritrichium sp. n. 16, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM; Momay, alt. 16,000 ft., *J. D. H.*

Stems 0–$\frac{2}{3}$ in., annual, erect, densely clothed with spreading leaves, terminated by numerous subfascicled spreading pedicels. *Leaves* $\frac{1}{4}$ in., sessile, subobtuse, patently villous. *Calyx-lobes* $\frac{1}{10}$ in., narrowly oblong. *Corolla* not seen. *Nutlets* $\frac{1}{20}$ in., with free apices, testa minutely reticulate and wrinkled; carpophore very short.

5. **E. Munroi,** *Clarke*; small, suberect, branched, leaves oblong lower spathulate, racemes numerous many-flowered, nutlets ovoid-oblong nearly smooth.—Eritrichium sp. n. 13, *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA, alt. 11–13,000 ft.; Kunawur, *Munro*, Kumaon, *Strach. & Winterb.*; Sikkim, Lachen, *J. D. H.*

Stems 1–4 in. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., patently villous. *Racemes* villous, dense in flower; in fruit pedicels sometimes $\frac{1}{3}$ in., upper ebracteate. *Calyx-lobes* in flower minute, in fruit $\frac{1}{8}$ in. or upwards, oblong-linear. *Flowers* hardly $\frac{1}{6}$ in. diam. *Nutlets* $\frac{1}{12}$ in., minutely reticulate and wrinkled; carpophore very short.—The fruit is imperfect, and there may be more than one species mixed here.

6. **E. tibeticum,** *Clarke*; lax, weak, diffuse, leaves elliptic mostly petioled, racemes elongate ebracteate, nutlets ovoid shining glabrous margins entire.—Eritrichium sp. n. 17, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Ladakh, alt. 9–10,000 ft., *Thomson.*

Rootstock slender, annual? *Stems* 6–10 in., numerous, slender. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., obtuse, spathulate, strigose. *Racemes* in fruit 6 in.; pedicels $\frac{1}{8}$ in., a few lower from leaflike bracts. *Calyx-lobes* $\frac{1}{12}$ in., ovate-oblong. *Flowers* $\frac{1}{8}$ in. diam. *Nutlets* $\frac{1}{18}$ in.; margin somewhat prominent.

VAR. *minor*; less strigose, stems 2–3 in., leaves $\frac{1}{4}$–$\frac{1}{3}$ in. Eritrichium sp. n. 15, *Herb. Ind. Or. H. f. & T.*—Sikkim; Phulloong, alt. 15,000 ft., *J. D. H.*

*** *Nutlets conic-obovoid, margin strong fringed with divided hairs.*

7. **E. basifixum,** *Clarke*; erect, leaves sessile broadly lanceolate softly villous, racemes dense bracteate, nutlets apparently basally attached, carpophore depressed hardly convex. Echinospermum sericeum, *Benth. in Royle Ill.* 306; *DC. Prodr.* x. 142.

ALPINE WESTERN HIMALAYA; from Kashmir to Gurwhal, alt. 13–15,000 ft.; *Royle, Lance, Jaeschke,* &c.

Stems 3–7 in., solitary or few, erect, divided at the apex. *Leaves* $\frac{2}{3}$ by $\frac{1}{5}$ in., acute, lower densely tufted, upper distant. *Racemes* in fruit $1\frac{1}{2}$ in.; pedicels 0–$\frac{1}{8}$ in.; bracts $\frac{1}{3}$ in. *Calyx-lobes* in fruit $\frac{1}{8}$ in., narrowly oblong. *Flowers* $\frac{1}{4}$ in. diam. and upwards, blue, purpurescent. *Nutlets* $\frac{1}{12}$ in., membranous, glabrous; circular back within the margin minutely hairy.—Closely allied to *E. villosum,* in which the margins of the nutlets carry broad-based flattened lanceolate ciliate-serrate teeth. In the typical *Eritrichiums* the scar of the nutlets is sub-punctiform at the apex of a depressed cone on the inner lower face; in *E. villosum,* DC. Prodr. x. 126 (Myosotis villosa, *Ledeb. Ic. Fl. Ross.* t. 215), this cone is less depressed; in *E. basifixum* it is elongate still more, so that the nutlets are attached apparently basally, nearly as in *Lithospermeæ.*

16. ROCHELIA, *Reichb.*

Annual or perennial, villous or hispid herbs. *Leaves* alternate. *Racemes* simple or branched, bracteate. *Flowers* small, blue or white. *Sepals* 5 (in non-Indian species 6–7), enlarged in fruit, linear or base auricled and sagittate. *Corolla-tube* cylindric, throat with or without scales; lobes small, spreading.

Stamens 5, included; anthers ovate, obtuse. *Ovary* 2-lobed, 2-celled; style from between the lobes, sublateral, shortly linear, stigma capitate; ovule 1 in each cell. *Nutlets* 2, 1-seeded, erect, ovate-oblong, granular-tubercular (in the Indian species); scar extending from the base to the middle.—Species 8; from India, through W. Asia to N. Africa and S. Europe; 1 in Australia.

1. **R. stellulata,** *Reichb. Iconogr.* ii. 13, t. 123; villous, subhispid, leaves narrowly oblong subspathulate, sepals in fruit linear incurved with hooked hairs, pedicels not exceeding the sepals. *DC. Prodr.* x. 176; *Boiss. Fl. Orient.* iv. 244. R. saccharata, *Reichb. in. Flora,* 1824, 243. Lithospermum dispermum, *Linn. Sp. Pl.* 191. L. retortum, *Pallas Voy.* (*ed. Gauthier*) v. 497, t. 16, fig. 3.

WESTERN TIBET; Nubra, *Thomson.*—DISTRIB. From Soongaria and Cabul to Spain and Algeria.

Stems 5–14 in., branched, wiry. *Leaves* 1 by $\frac{1}{5}$ in., lower subpetioled. *Racemes* in fruit 2–12 in.; bracts to nearly all the flowers, leaflike, smaller upwards. *Sepals* in flower scarcely $\frac{1}{20}$ in., in fruit nearly $\frac{1}{4}$ in. *Corolla* $\frac{1}{8}$ in. long, less than $\frac{1}{10}$ in. diam. *Nutlets* nearly $\frac{1}{8}$ in. long, white-tuberculate; style hardly longer than the nutlets; pedicels in fruit subpatent, not distinctly recurved nor thickened.

2. **R. stylaris,** *Boiss. Fl. Orient.* iv. 245; adpressedly villous, leaves spathulate-oblong or sublinear, sepals in fruit linear incurved without hooked hairs, pedicels exceeding the sepals. R. stellulata, *Aitchison Punjab List,* 67.

KASHMIR, and adjoining PUNJAB PLAINS, frequent; *Thomson, Vicary,* &c.—DISTRIB. Cabul.

Annual, 2–8 in., erect. *Leaves* narrower, *racemes* slenderer than in *R. stellulata. Pedicels* in fruit deflexed, scarcely thickened. *Style* considerably exceeding the nutlets.—Closely allied to *R. stellulata.*

3. **R. rectipes,** *Stocks in Hook. Kew Journ.* iv. 176; villous, subhispid, leaves oblong, sepals in fruit ligulate base keeled with spreading scarcely hooked hairs, pedicels about equalling the sepals.

WESTERN TIBET; Zanskar, *Thomson.*—DISTRIB. Cabul and Beloochistan.

Annual; stems 2–5 in., erect, with ascending branches. *Leaves* $\frac{2}{3}$ by $\frac{1}{8}$ in., lower spathulate or sublinear. *Racemes* in fruit 1–4 in., somewhat dense, bracteate. *Sepals* in fruit $\frac{1}{4}$ by $\frac{1}{24}$ in. wide at the base, hairs soft hardly hooked even when dry. *Corolla* pale-blue, with a white throat (*Stocks*). *Nutlets* scarcely half as long as the sepals; fruiting pedicels suberect, not thickened.—Boissier (*Fl. Orient.* iv. 246) reduces this species to *R. macrocalyx,* Bunge (in Pl. Lehm. 419). But Bunge describes the fruiting sepals as bigibbous at the base and very hispid, which does not fit. There is another Cabul plant of Griffith's which (ex descr.) may be *R. macrocalyx,* Bunge, and which may have been sent to Boissier as *R. rectipes.*

4. **R. cardiosepala,** *Bunge in Pl. Lehm.* 420; strigose, subhispid, leaves oblong, sepals in fruit ovate-lanceolate auriculate-cordate at the base hispid, pedicels in fruit recurved as long as the sepals. *Boiss. Fl. Orient.* iv. 246.

WESTERN TIBET; Nubra, *Thomson.*—DISTRIB. Turkestan.

Annual, erect, 6–8 in., very ramous. *Leaves* $1\frac{1}{4}$ by $\frac{1}{4}$ in., lower spathulate or petioled. *Racemes* lax, 2–5 in.; bracts to nearly all the flowers, leaflike, smaller upwards. *Sepals* in flower, $\frac{1}{8}$ in., white silky, in fruit $\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in. *Corolla* $\frac{1}{6}$ by $\frac{1}{8}$ in. *Nutlets* $\frac{1}{8}$ in., rather larger than of *R. stellulata.*

17. **ASPERUGO,** *Linn.*

A procumbent, scabrous-hispid annual. *Leaves* alternate and subopposite, spathulate-oblong or petioled, subentire. *Flowers* small, axillary, subsessile,

solitary or paired. *Calyx* campanulate, 5-fid half-way down; in fruit much enlarged, rigid, compressed, lobes toothed nervose. *Corolla-tube* short, mouth closed with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate-oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma small capitate. *Nutlets* 4, erect, ellipsoid-oblong, laterally compressed, smooth, stony, attached at a small subpunctiform scar above their middle; carpophore conoid.

A. procumbens, *Linn.*; *DC. Prodr.* x. 146; *Lamk. Ill.* t. 94; *Engl. Bot.* t. 661; *Sibth. Fl. Gr.* t. 177; *Reichb. Fl. Germ.* t. 1327; *Boiss. Fl. Orient.* iv. 275.

PUNJAB and KASHMIR, alt. 1–7000 ft.; extending to 13,000 ft. in WESTERN TIBET and the KARAKORUM; a weed especially near cultivation, *Thomson*, &c.—DISTRIB. Europe, N. Africa, W. Central and N. Asia.

Spreading, 1–2 ft., branched. *Leaves* 1–2½ in. *Flowers* $\frac{1}{5}$ in. diam., purplish-blue or white; calyx-lobes in flower, $\frac{1}{20}$ in., oblong. *Nutlets* $\frac{1}{8}$–$\frac{1}{6}$ in.; calyx in fruit ½ in. diam., reticulately-nerved; lobes large, triangular.

18. MICROULA, *Benth.*

An almost stemless, scabrous-pubescent herb. *Radical leaves* elliptic-spathulate, rosulate. *Cymes* dense, many-fld., subsessile among the leaves, bracteate. *Flowers* small, sessile. *Calyx* campanulate; lobes 5, ciliate. *Corolla-tube* short, throat with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate-oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma small capitate. *Nutlets* 4, or fewer, ovoid-oblong, dorsally compressed, attached by a small scar above their middle.

M. Benthami, *Clarke.*

WESTERN TIBET, alt. 15–17,000 ft.; Parang Pass, *Thomson*; Kyoongar Pass, *Strachey & Winterbottom.*

Root long, vertical, crowned by a tuft of leaves longer than the inflorescence; but one example has a stem of 3 in., with inflorescence as in *Eritrichium*. *Leaves* 3 in. *Flowers* ¼–⅓ in. diam. *Nutlets* $\frac{1}{8}$ in., backs diamond-shaped, scabrous with subsessile glochidia.

19. BOTHRIOSPERMUM, *Bunge.*

Weak herbs, annual or biennial, strigose or hirsute. *Leaves* alternate, ovate or lanceolate. *Flowers* small, blue or white, axillary, pedicelled, the upper going off into a bracteate raceme. *Calyx* 5-partite; lobes narrow, not (or scarcely) enlarged in fruit. *Corolla-tube* short, throat with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* deeply 4-lobed; style short, stigma capitate. *Nutlets* 4, ellipsoid, without angles, granular-scabrid; scar near the middle of the inner face, large, hollow, smooth, with an inflexed margin; carpophore oblong.—Species 2 or 3; from N. India to Amurland.

B. tenellum, *Fisch. & Mey. Ind. Sem.* 1835, 24; adpressedly hispid, leaves ovate-lanceolate lower petioled, pedicels axillary as long as the calyx, scar of the nutlets elliptic longitudinal. *DC. Prodr.* x. 116. B. asperugoides, *Sieb. & Zucc. Fam. Nat. Jap.* ii. 26. Anchusa tenella, *Hornem.*; *Roem. & Sch. Syst.* iv. 100. A. zeylanica, *Jacq. f. Ecl.* i. 47, t. 29. Cynoglossum diffusum, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 7; *Wall. Cat.* 925. C. prostratum, *Don Prodr.* 100.

Throughout N. INDIA, alt. 0–4000 ft., from the foot of the N.W. Himalaya and Jubbulpore to BHOTAN and KHASIA; not common.—DISTRIB. Amurland, Japan, China, with neighbouring islands. (Mauritius introduced).

Usually prostrate or diffuse, 1–2 ft. with elongate branches and distant axillary flowers; sometimes suberect 3–6 in. with erect, close racemes. *Leaves* 1 by $\frac{1}{4}$-$\frac{1}{3}$ in., subacute. *Calyx-lobes* in fruit $\frac{1}{8}$-$\frac{1}{6}$ in., lanceolate or linear. *Corolla* $\frac{1}{6}$ in. diam., white. *Nutlets* $\frac{1}{20}$–$\frac{1}{16}$ in.; scar more than half their length.

20. GASTROCOTYLE, *Bunge.*

A hispid, diffuse herb. *Leaves* alternate, oblong, lowest spathulate or petioled. *Flowers* small, axillary, solitary and shortly pedicelled, or in dense small, axillary racemes. *Calyx* 5-partite. *Corolla-tube* short, closed with scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style short, stigma subcapitate. *Nutlets* 4, or fewer, ovoid, erect, incurved; scar on the inner face, near their middle, oblong, longitudinal, elevated, margined; carpophore half as long as the nutlets; apex with 4 ridges.

G. hispida, *Bunge Rel. Lehm.* 405. Anchusa hispida, *Forsk. Fl. Æg.-Arab.* 40; *DC. Prodr.* x. 50; *Boiss. F Orient.* iv. 158.

PUNJAB, alt. 1000 ft.; *Thomson*, &c.—DISTRIB. From Egypt to Beloochistan, Cabul, and Soongaria.

Leaves 1–2 in. *Calyx-lobes* $\frac{1}{8}$-$\frac{1}{6}$ in., coarsely hispid. *Corolla* $\frac{1}{5}$ in. diam. *Nutlets* $\frac{1}{8}$-$\frac{1}{6}$ in., rugose, minutely papillose between the wrinkles, undistinguishable from those of *Lycopsis*.

21. ANCHUSA, *Linn.*

Hispid or bristly herbs. *Leaves* alternate. *Cymes* dichotomous, or racemes unilateral, terminal ultimately elongate. *Calyx* deeply 5-fid, not (or scarcely) enlarged in fruit. *Corolla-tube* straight, long or short, closed with scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma small. *Nutlets* 4, ovoid, conoid, sessile on a flat receptacle; scar basal, concave, margined.—Species 30; Europe, Africa, and W. Asia.

A. italica, *Retz*, is said to grow in Kashmir (*DC. Prodr.* x. 47); but it is almost certainly a cultivated plant, and the specimens, which were in Royle's Herbarium, were very probably from the Saharunpur Garden.

A. sikkimensis, *Clarke*; erect, tall, bristly, leaves petioled elliptic or oblong, cymes short bracteate forming a terminal panicle, corolla-tube shortly exceeding the sepals.

ALPINE SIKKIM, alt. 11–12,000 ft., Lachen and Latong, *J. D. H.*

Stem 2-3 ft. *Cauline leaves* $2\frac{1}{4}$ by 1 in., subacute; petiole $\frac{1}{3}$ in. *Calyx-lobes* $\frac{1}{10}$ in., narrow. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., blue. *Nutlets* not ripe, dorsally compressed; backs diamond-shaped, scabrous; scar very small.—The nutlets are exceedingly like those of *Microula*, and do not agree well with those of *Anchusa*; but the habit is altogether that of *Anchusa sempervirens*, &c. Mr. Bentham has referred the species to *Anchusa*, and it had better remain here till good fruit is obtained; to remove it to *Microula* would require the characters of that genus to be considerably modified.

22. LYCOPSIS, *Linn.*

Annual, hispid herbs. *Leaves* alternate. *Flowers* small, blue purple or white; racemes bracteate, terminal. *Sepals* 5, linear. *Corolla-tube* curved in

the middle, somewhat longer than the calyx; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style filiform, stigma capitate. *Nutlets* 4, ovoid, suberect, reticulate-rugose; scar on the inner face, near the middle, oblong, longitudinal, elevated, margined; carpophore conical.—Species 3–4, of the Mediterranean region.

L. arvensis, *Linn.*; *DC. Prodr.* x. 54; erect, bristly, leaves oblong acute upper amplexicaul lower petioled, corolla-lobes subequal. *Lamk. Ill.* t. 92; *Engl. Bot.* t. 938. Anchusa arvensis, *Bieb. Fl. Taur.-Cauc.* i. 123; *Reichb. Ic. Fl. Germ.* t. 1310, fig. 1; *Boiss. Fl. Orient.* iv. 160.

KASHMIR and WESTERN TIBET, alt. 3–8000 ft.; from near Peshawur to Skardo, *Royle, Thomson*, &c.—DISTRIB. Europe, W. & N. Asia.

Stem 1–2 ft. *Leaves* 2 by $\frac{1}{3}$ in. *Racemes* in fruit 3–6 in.; pedicels $\frac{1}{8}$ in.; bracts $\frac{1}{2}$ in., lanceolate, or lower leaflike. *Sepals* in flower $\frac{1}{6}$ in., hispid, oblong-linear, in fruit $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{4}$ in., narrowly cylindric; lobes $\frac{1}{8}$ in., blue, or in the Indian plant usually white. *Stamens* attached near the base of the corolla-tube. *Nutlets* $\frac{1}{8}$–$\frac{1}{6}$ in., 12 not papillose-scabrid between the wrinkles.

23. NONNEA, *Moench.*

Annual or perennial herbs, hispid or villous, usually diffuse. *Leaves* alternate. *Cymes* dense, in fruit elongate, bracteate. *Calyx* 5-fid, shortly or halfway down; in fruit much enlarged, tube enclosing the nutlets. *Corolla-tube* straight, about as long as the calyx, throat naked or hairy (not with scales), small scales sometimes present lower down; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included or scarcely exsert; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma shortly or obscurely 2-lobed. *Nutlets* 4, ovoid, reticulate-rugose, on a depressed-conic receptacle; scar large, basal, oblique, concave, with a central appendage and very hard margin.—Species 20; in Europe, N. Africa, W. and Central Asia.

N. pulla, *Lamk. et DC. Fl. Fr.* iii. 626, *in note*; erect, hairy, leaves oblong acute upper subamplexicaul lower petioled, calyx-lobes acuminate, corolla blackish-purple, stamens included. *DC. Prodr.* x. 32; *Reichb. Ic. Fl. Germ.* t. 1302, fig. 2; *Boiss. Fl. Orient.* iv. 166. N. taurica, *Ledeb. Fl. Ross.* iii. 112. N. Edgeworthii, *A. DC. Prodr.* x. 30. Lycopsis pulla, *Linn.*; *Jacq. Fl. Austr.* ii. t. 188; *Gaertn. Fruct.* i. 327, t. 67. Anchusa pulla, *Bieb. Fl. Taur.-Cauc.* i. 125.—Boraginearum sp., *Edgw. in Hook. Journ. Bot.* ii. 284.

PUNJAB PLAIN, *Thomson, Edgeworth*, &c.—DISTRIB. Central and E. Europe, W. Asia.

Much branched, 12–18 in., hispid and villous. *Leaves* 2 by $\frac{1}{3}$ in. *Racemes* 2–5 in., dense; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in.; bracts 1 in., leaflike. *Calyx* $\frac{1}{4}$ in.; in fruit $\frac{1}{2}$ in., the campanulate base $\frac{1}{4}$ in. diam.; subglobose. *Corolla-tube* $\frac{1}{4}$ in., narrow; lobes $\frac{1}{6}$ in., half-spreading. *Nutlets* $\frac{1}{6}$ in., obliquely curved inwards, slightly wrinkled, puberulous.

24. MERTENSIA, *Roth.*

Perennial herbs, strigose or softly hairy. *Leaves* alternate. *Racemes* terminal, scorpioid, usually simple, dense or lax; bracts 0. *Flowers* blue or purplish, pedicelled. *Sepals* narrow, somewhat enlarged in fruit. *Corolla-tube* as long as, or much longer than, the calyx; throat with or without scales; lobes 5, imbricate in bud, short, obtuse, spreading or suberect. *Stamens* 5, included or scarcely exserted, filaments short linear; anthers oblong, obtuse. *Ovary-lobes* 4; style filiform, often very long, stigma small. *Nutlets* 4, erect,

ovoid-oblong, obscurely dorsally compressed, smooth, slightly angular; scar small, triangular, at the very base of the inner angle, not strongly margined.—Species 15; in E. Europe, extratropical Asia, and N. America.

Trigonitis differs by its short corolla-tube and shortly trigonous (not oblong) nutlets. *Myosotis* differs by its short corolla-tube and twisted corolla-lobes. The length of the corolla is variable in the species of this genus.

1. **M. elongata**, *Benth. in Gen. Pl.* ii. 857; adpressedly hairy, leaves oblong lower long-petioled spathulate, raceme many-flowered at length elongate, corolla-tube a little longer than the calyx, scales in the throat very small. Lithospermum elongatum, *Dcne. in Jacquem. Voy. Bot.* 121, t. 126. Eritrichium elongatum, *A. DC. Prodr.* x. 124.

KASHMIR, alt. 5–8000 ft.; *Jacquemont, Falconer.*

Rootstock somewhat stout, annual stems 8 in. *Radical leaves* 2 by ½ in.; petiole 1½ in.; cauline 2 by ½ in., sessile, acute, hairs adpressed from tubercular bases. *Raceme* in fruit 3½ in., long-peduncled; pedicels ⅕ in., rigid, suberect. *Calyx-lobes* ⅛ in., linear, sparingly strigose; in fruit ⅙ in. *Corolla* ⅓ in. diam., tube ⅙ in. long; scales in the throat very small; lobes spreading. *Anthers* subsessile, above the scales. *Style* ⅓ in. *Nutlets* $\frac{1}{10}$ in., white or pale, shining.—Described from Jacquemont's specimen.

2. **M. moltkioides**, *Clarke*; patently hairy, leaves oblong or elliptic lower long-petioled spathulate, racemes many-flowered, corolla-tube nearly twice as long as the calyx, scales in the throat small. Anchusa moltkioides, *Benth. in Royle Ill.* 305, t. 73, fig. 1; *DC. Prodr.* x. 51. Lithospermum moltkioides, *Dcne. in Jacquem. Voy. Bot.* 122.

KASHMIR, alt. 8000 ft., *Falconer*; near Islamabad, *Thomson.* PANGEE; *Dr. Watt.*

Very near *M. elongata*; leaves more softly hairy, hairs on the midrib beneath patent or reflexed. *Racemes* shorter peduncled. *Calyx* larger. *Corolla-tube* ⅓ by $\frac{1}{18}$ in. *Nutlets* brown-black, not more excavate at the base than are those of *M. elongata.*

VAR. *Thomsoni*; radical leaves large elliptic acute, corolla exceeding ½ in. diam. with tube ½ in. long. Mertensia sp. n. 3, *Herb. Ind. Or. H. f. & T.*—Kashmir, alt. 11,000 ft.; near Islamabad, *Thomson.* Radical *leaves* 3 by 1½ in., base subobtuse. *Pedicels* in fruit ¼–½ in. *Sepals* in fruit ⅓ in. and upwards, narrowly oblong, patently hairy. *Nutlets* exceeding ⅛ in. brown-black.

3. **M. echioides**, *Benth. in Gen. Pl.* ii. 857; softly hairy, leaves oblong lower long-petioled spathulate, raceme dense many-fld., corolla-tube one-third longer than the calyx-lobes erect scales in the throat obsolete, anthers exsert from the tube. Lithospermum echioides, *Benth. in Royle Ill.* 305; *DC. Prodr.* x. 83. L. secundiflorum, *Dcne. in Jacquem. Voy. Bot.* 120, t. 125. Eritrichium secundiflorum, *A. DC. Prodr.* x. 124.

KASHMIR and WESTERN TIBET, alt. 5–12,000 ft.; from the Upper Indus to the southern face of the Himalaya, frequent; *Royle, Falconer*, &c.

Stems 6–15 in. *Leaves* 1⅓ by ⅓ in., subobtuse. *Peduncles* long; racemes 1–3 in., dense even in fruit; pedicels ⅛–⅕ in., linear. *Corolla-tube* ⅕–¼ in., lobes ⅙ in. *Filaments* linear, distinct; anthers completely exsert, but not reaching above its lobes. *Style* and *nutlets* as of *M. elongata.*—Easily distinguished from all the other species of *Mertensia* by its erect corolla-lobes.

4. **M. primuloides**, *Clarke*; strigose, leaves small elliptic lower very shortly petioled, raceme dense not many-flowered, corolla-tube ¼ in. twice as long as the calyx, scales in the throat distinct. Eritrichium primuloides, *Dcne. in Jacquem. Voy. Bot.* 123, t. 128; *A. DC. Prodr.* x. 125.

ALPINE WESTERN HIMALAYA, *Jacquemont*; Sai and Gilgit, alt. 15,000 ft., *Col. Tanner.*

Stems 3 in., densely leafy below. *Leaves* $\frac{1}{3}$ by $\frac{1}{6}$ in., narrowed at both ends; petiole short or very broad. *Peduncle* 1 in. *Raceme* in flower $\frac{1}{2}$ in.; pedicels $\frac{1}{12}$ in. *Calyx-lobes* $\frac{1}{8}$ in., narrowly oblong. *Corolla* $\frac{1}{4}$ in. diam. *Anthers* subexsert, overtopping the small scales. *Style* $\frac{1}{3}$ in. *Fruit* unknown.

VAR. *Tanneri*; leaves 2 in. linear-spathulate, calyx-lobes $\frac{1}{5}$ in., corolla violet-purple, tube $\frac{1}{3}$ in. long.—Gilgit and Astor, *Col. Tanner*. This looks like a distinct species, but there is only a fragment (in flower).

5. **M. tibetica,** *Clarke*; hispid, leaves small subradical long-petioled elliptic, peduncles long subscapose, corolla-tube $\frac{2}{3}$–$\frac{3}{4}$ in. five times as long as the calyx, anthers included, scales in the corolla-throat large.

WESTERN TIBET; Karakorum, alt. 14–16,000 ft., *Clarke*.

Leaves all subradical, $\frac{2}{3}$ by $\frac{1}{4}$ in., petiole 1 in. *Peduncles* 2–4 in.; racemes 1–4 in.; pedicels $\frac{1}{6}$ in. *Sepals* $\frac{1}{8}$ in., narrowly oblong; in fruit $\frac{1}{5}$ in. *Corolla-tube* elongate-funnel-shaped, $\frac{1}{8}$ in. wide in the throat; lobes $\frac{1}{8}$ in. and upwards, subquadrate; scales half as long as the lobes, obtuse, emarginate; anthers entirely below the scales. *Style* $\frac{3}{4}$ in. *Nutlets* as of *M. moltkioides*.

6. **M. racemosa.** *Benth. in Gen. Pl.* ii. 857; minutely hairy, radical leaves long-petioled ovate cauline ovate to lanceolate, racemes lax few-flowered, corolla-tube half as long again as the calyx. Myosotis racemosa, *Benth. in Royle Ill.* 305. M. longiflora, *Wall. Cat.* 929; *A. DC. Prodr.* x. 113. Lithospermum ovalifolium, *Dcne. in Jacquem. Voy. Bot.* 119, t. 124. Eritrichium nemorosum, *A. DC. l. c.* 123. Anchusa racemosa, *DC. Prodr.* x. 50.

TEMPERATE WESTERN HIMALAYA, alt. 7–10,000 ft.; Gurwhal and Kumaon, frequent near Simla; *Royle, Munro, Madden*, &c.

Stems 3–8 in., weak, nearly glabrous. *Radical leaves* 1–1$\frac{1}{2}$ in., often suborbicular, obtuse, base sometimes cordate; petiole 1–4 in.; cauline similar, smaller, often nearly all petioled. *Racemes* subsessile, i.e. bracteate at the base; pedicels attaining $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* $\frac{1}{10}$ in., linear; in fruit $\frac{1}{5}$ in., villous. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; tube $\frac{1}{5}$ in., scales in the throat prominent; anthers below the scales. *Style* $\frac{1}{4}$–$\frac{1}{3}$ in. *Nutlets* as of *M. moltkioides*.

25. MOLTKIA, *Lehm.*

Corolla abbreviated with small erect lobes hardly overtopping the calyx. *Anthers* long exsert on filiform filaments. Otherwise as *Mertensia*.

M. parviflora, *Clarke*; minutely hairy, leaves linear-oblong, racemes peduncled dense scorpioid ebracteate. Craniospermum parviflorum, *Dcne. in Jacquem. Voy. Bot.* 126, t. 130; *A. DC. Prodr.* x. 175.

KASHMIR, alt. 6–8000 ft.; *Thomson, Aitchison*.—DISTRIB. Cabul.

Rootstock woody; annual stems 3–10 in., suberect, with sometimes a long trailing stem added. *Leaves* 2 by $\frac{1}{5}$ in. *Racemes* 1–2 in., dense, sometimes forked; pedicels 0–$\frac{1}{6}$ in. *Calyx-lobes* $\frac{1}{8}$ in., narrowly oblong; in fruit $\frac{1}{5}$ in. rather wider. *Corolla* without scales in the throat. *Filaments* exsert $\frac{1}{8}$ in. *Style* $\frac{1}{4}$ in. *Nutlets* ovoid-oblong, acute, smooth, shining; scar small at the base on the inner side.—All the other species of *Moltkia* have bracteate racemes. Nutlets altogether of *Mertensia*, and the plant hardly differs from *M. echioides* but in the abbreviated corolla and longer filaments. *Craniospermum* has exsert anthers but is remote in habit and in the fruit.

26. TRIGONOTIS, *Steo.*

Perennial herbs, weak or diffuse, more or less hairy. *Leaves* alternate, ovate or lanceolate, mostly petioled. *Racemes* lax, ebracteate, or the lower pedicels bracteate, or many pedicels axillary. *Calyx* 5-fid, or 5-partite, in fruit

not or slightly enlarged. *Corolla* small, blue or white; tube shorter than the calyx, throat with 5 small scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, not elongate, stigma capitate. *Nutlets* 4, tetrahedral with 4 acute or submarginate edges, hardly longer than broad, shining black; scar small, basal, substipitate.—Species 10; Central and E. Asia.

* *Nutlets glabrous* (three very closely allied species).

1. **T. microcarpa,** *Benth. in Gen. Pl.* ii. 858; leaves petioled ovate acute minutely strigose on both surfaces, racemes terminal, solitary axillary pedicels added, fruiting sepals oblong acuminate. Myosotis microcarpa, *Wall. Cat.* 928. Eritrichium microcarpum, *DC. Prodr.* x. 123.

ALPINE NEPAL and SIKKIM, alt. 10,000 ft.; *Wallich, J. D. H.*

Stems 6–20 in., procumbent, divided. *Cauline leaves* 1 by $\frac{1}{2}$ in., mucronate, obtuse or rounded at the base, petiole $\frac{1}{4}$ in.; radical leaves rather larger petioled, $1\frac{1}{2}$ in. *Racemes* in fruit 3–6 in,, ebracteate, i.e. lower scattered pedicels in the axils of fully-developed leaves; pedicels $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{20}$ in., in fruit $\frac{1}{16}$–$\frac{1}{12}$ in. *Flowers* $\frac{1}{8}$ in. diam. *Nutlets* $\frac{1}{20}$ in. diam.

2. **T. rotundifolia,** *Benth. in Gen. Pl.* ii. 858; cauline leaves sessile or petioled elliptic narrowed at both ends minutely strigose, racemes terminal, calyx-lobes elliptic acute. Myosotis rotundifolia, *Wall. Cat.* 930. Eritrichium rotundifolium, *DC. Prodr.* x. 123.

SUBALPINE HIMALAYA, alt. 6–10,000 ft.; *Royle*; Kumaon, *Wallich*; Sikkim (Lachen), *J. D. H.*

Stems weak, 2–4 in. *Cauline leaves* $\frac{1}{2}$–$\frac{2}{3}$ in.; radical long-petioled, some orbicular but many spathulate.—Does not differ from *T. microcarpa* except in being smaller, with subsessile leaves more attenuate at the base. Wallich's example is not in good fruit.

3. **T. multicaulis,** *Benth. in Gen. Pl.* ii. 858; cauline leaves sessile or petioled elliptic narrowed at both ends minutely strigose, racemes terminal, calyx-lobes in fruit ovate acute. Myosotis multicaulis, *Wall. Cat.* 7020. Eritrichium multicaule, *DC. Prodr.* x. 123.

CENTRAL and EASTERN HIMALAYA; NEPAL; *Wallich.* SIKKIM, alt. 10–12,000 ft.; Latong, *J. D. H.*

Stems 10 in. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., upper sessile. *Pedicels* $\frac{1}{4}$ in.—Described from Wallich's examples, which resemble his *T. rotundifolia*, but are larger. The Sikkim ones are much smaller, with fruiting pedicels hardly exceeding $\frac{1}{8}$ in. and the nutlets brown yellow.

** *Nutlets minutely patently hairy on all sides.*

4. **T. ovalifolia,** *Benth. in Gen. Pl.* ii. 858; leaves petioled ovate minutely strigose on both surfaces, racemes terminal with solitary axillary pedicels added, fruiting sepals elliptic acuminate. Myosotis ovalifolia, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 9, and *Cat.* 927. Eritrichium ovalifolium, *DC. Prodr.* x. 123.

CENTRAL and EASTERN HIMALAYA; Nepal and Sikkim, alt. 8–12,000 ft., frequent; *Wallich. J. D. H.*, &c.

Stems 8–24 in., mostly prostrate. *Cauline leaves* $\frac{1}{4}$–$1\frac{1}{4}$ in., from elliptic to orbicular, obtuse, base often cordate, petiole $\frac{1}{8}$–$\frac{1}{2}$ in. *Pedicels* sometimes all axillary $\frac{1}{4}$–$\frac{1}{2}$ in.; terminal racemes generally added. *Calyx-lobes* in fruit $\frac{1}{8}$–$\frac{1}{6}$ in. *Flowers* $\frac{1}{4}$ in. diam. and upwards. *Nutlets* $\frac{1}{16}$–$\frac{1}{12}$ in. diam.—Had there been as few specimens of this as of the three preceding species, the axillary-flowered examples would indubitably have been reckoned distinct from Wallich's terminal-racemed ones.

5. **T. Hookeri,** *Benth. in Gen. Pl.* ii. 858; leaves elliptic acute hispid-villous, racemes lateral and terminal elongate ebracteate, calyx-lobes oblong acuminate hispid villous.

KHASIA MTS., alt. 5–6000 ft.; Moflong, *H. f. & T.*

Stems 2 feet at least, stout, branched, patently hispid villous. Cauline *leaves* 2 by $\frac{1}{2}$–$\frac{3}{4}$ in., base obtuse; petiole 0–$\frac{1}{5}$ in. *Racemes* 3–6 in., often peduncled, axillary; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx-lobes* in fruit $\frac{1}{8}$–$\frac{1}{6}$ in. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Nutlets* $\frac{1}{12}$ in. diam.—This is an ennobled species of *Trigonotis*, much finer than the others, but the nutlets nearly as of *T. ovalifolia.*

27. MYOSOTIS, *Linn.*

Annual or perennial, *hairy* herbs. *Leaves* alternate or densely crowded. *Racemes* elongate, ebracteate, or flowers subsessile and solitary in the penultimate axils. *Calyx* shortly or deeply 5-fid, hardly altered in fruit. *Corolla* blue, changing to red, or white, tube short, mouth closed with scales; lobes 5, twisted to the right in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma small. *Nutlets* 4, ovoid-oblong, longer than broad, shining, smooth, or hairy upwards; scar basal, small; receptacle flat.—Species 30; temperate regions of the N. hemisphere; in Australia and New Zealand.

SECT. I. **Eumyosotis,** A. DC. Weak *herbs. Leaves* distant. *Racemes* elongate, scorpioid. *Nutlets* glabrous.

1. **M. cæspitosa,** *Schultz Fl. Starb.* ii. 11; hairs of stem adpressed, leaves oblong lowest spathulate, pedicels longer than the calyx, calyx-teeth triangular-lanceolate about as long as the tube adpressedly hairy. *DC. Prodr.* x. 105, *with syn.*; *Syme Engl. Bot.* t. 1103; *Boiss. Fl. Orient.* iv. 235. M. palustris, *Benth. in Royle Ill.* 305, *not exactly of With.* M. lingulata, *Lehm. Asperif.* 110, *name only.*

TEMPERATE and SUBALPINE HIMALAYA, from Kunawur to Kashmir and Baltisthan; *Royle, Falconer, Thomson.*—DISTRIB. From Cabul to Siberia, Europe and N. Africa, N. America.

Stems 4–20 in. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in. *Racemes* 2–8 in.; lower fruiting pedicels $\frac{1}{4}$ in. and upwards. *Calyx* in fruit $\frac{1}{5}$ in., sparsely minutely strigose; teeth scarcely acute. *Corolla* $\frac{1}{6}$ in. diam. *Style* shorter than the calyx.—The name *M. lingulata*, Lehm. is one year prior to *M. cæspitosa*, Schultz; but Boissier and most authors do not consider the notice of the plant by Lehmann to be worthy the rank of a "description."

2. **M. sylvatica,** *Hoffm. Deutsch. Fl.* i. 85; hairs of stem spreading, leaves oblong lowest petioled, pedicels longer than the calyx, calyx villous some of the hairs spreading at base, teeth lanceolate longer than the tube, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. diam. limb flat. *DC. Prodr.* x. 107 *with syn.*; *Syme Engl. Bot.* t. 1107; *Boiss. Fl. Orient.* iv. 237. M. montana, *Besser*; *Fl. Dan.* t. 583. M. pallens, *Wall. Cat.* 7019; *DC. l. c.* 112.

ALPINE WESTERN HIMALAYA, alt. 7–12,000 ft., from Kumaon to Kashmir, frequent; *Wallich*, &c.—DISTRIB. Europe; N. West Asia to the Canaries.

Stems 4–16 in., mostly erect, sparingly villous. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., lowest broader. *Racemes* 2–8 in., often divided; lower fruiting pedicels usually $\frac{1}{4}$ in. or more, hardly longer than the calyx in Wallich's *M. pallens*. *Calyx* in fruit $\frac{1}{8}$–$\frac{1}{6}$ in., with many ascending hairs and some patent from the base; teeth in fruit erect hardly connivent.

3. **M. arvensis,** *Hoffm. Deutsch. Fl.* i. 85; hairs of stem spreading, leaves oblong lowest petioled, pedicels longer than the calyx, calyx villous

some of the hairs spreading at base, teeth lanceolate longer than the tube, corolla $\frac{1}{8}$–$\frac{1}{4}$ in. diam. limb concave. *Engl. Bot.* t. 2558. M. intermedia, *Link. Enum.* i. 164; *DC. Prodr.* x. 108; *Boiss. Fl. Orient.* iv. 239.

SUBALPINE KASHMIR; *Aitchison.*—DISTRIB. Cabul and Siberia to N. Africa and Europe.

Hardly distinguishable from *M. sylvatica* but by the smaller corolla. *Pedicels* in fruit longer. *Calyx-teeth* in fruit connivent over the nutlets.—Aitchison's example is as near English *M. arvensis* as may be; there are other Kashmir examples supposed to be *M. arvensis* or *M. intermedia,* but they cannot be distinguished in the herbarium from *M. sylvatica.*

4. **M. stricta,** *Link. Enum.* i. 164; hairs of stem spreading, leaves oblong lower subsessile, lower pedicels in fruit shorter than the calyx, calyx villous some of the hairs spreading at base, teeth lanceolate longer than the tube erect in fruit. *DC. Prodr.* x. 109; *Boiss. Fl. Orient.* iv. 239.

KASHMIR, *Falconer*; alt. 5–6000 ft., *Thomson*; Pangee, *Dr. Watt.*—DISTRIB. Cabul, W. Asia, N. Africa, Europe.

Stems 3–8 in. erect. *Leaves* $\frac{3}{4}$ by $\frac{1}{5}$ in., narrowed at both ends. *Racemes* 3–5 in., often reduced nearly to a spike, with closely approximated flowers.

SECT. 2. Small, densely tufted herbs. *Leaves* crowded. *Flowers* solitary, sub-sessile. *Nutlets* hairy upwards.

5. **M. Hookeri,** *Clarke*; leaves obovate-spathulate villous.

ALPINE SIKKIM, alt. 15–17,000 ft.; Kinchinjow, Lama Kangra, and Phulloong, *J. D. H.*

Appearing like a small tufted Alpine *Cerastium,* but with bright blue flowers. *Stems* 1–3 in., repeatedly dichotomous, most densely clothed with leaves in appearance whorled, lower withering or scale-like. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in., very obtuse, with much soft straight long white hair. *Flowers* just emergent from the tufts, nearly as of *Myosotis arvensis* and *sylvatica.* *Nutlets* nearly as of *M. arvensis,* but with some erect hairs in the upper half.

IMPERFECTLY KNOWN SPECIES.

M. ROBUSTA, *Don Prodr.* 101; *DC. Prodr.* x. 112; roots perennial fusiform; stem $1\frac{1}{2}$ feet, ascending, simple, hairy; leaves 3 by $\frac{2}{3}$ in. sessile, elliptic oblong, acute, hairy on both surfaces; racemes paired, short, ebracteate; calyx-segments ovate obtuse, larger than the corolla-tube.—Nepal, Gossainthan, *Wallich.*—Known only by Don's description, which does not accord with any of the described species.

28. LITHOSPERMUM, *Linn.*

Herbs or undershrubs, hispid or rough. *Leaves* alternate. *Flowers* white blue or yellow, axillary solitary or in terminal bracteate racemes. *Sepals* 5, linear. *Corolla* tubular-funnel-shaped, throat naked or with 5 small scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse or apiculate. *Ovary* deeply 4-lobed; style filiform or cylindric, stigma usually 2-fid. *Nutlets* 4, erect, ovoid, stony, smooth or rough; scar flat, basal; receptacle nearly flat.—Species 40, in the temperate N. hemispheres, Africa, and S. America.

1. **L. arvense,** *Linn.*; *DC. Prodr.* x. 74; strigose, leaves lanceolate lower petioled obovate-oblong, corolla white rarely blue tube not longer than the calyx, nutlets ovoid-oblong tuberculate. *Engl. Bot.* t. 123; *Boiss. Fl. Orient.* iv. 216. Margarospermum arvense, *Dcne. in Jacquem. Voy. Bot.* 122.

KASHMIR; Peshawur, *Vicary*. WESTERN TIBET, *Thomson*.—DISTRIB. From Cabul, Siberia to N. Africa, Europe.

Annual. *Stems* 12–24 in., erect. *Cauline leaves* 1 by $\frac{1}{4}$ in., strigose, hairs often from tuberculate bases. *Racemes* in fruit 4–10 in., pedicels $\frac{1}{10}$ in.; bracts leaflike, smaller upwards. *Corolla* $\frac{1}{4}$ in. long, hairy upwards. *Nutlets* $\frac{1}{8}$ in., gradually narrowed upwards; sepals in fruit $\frac{1}{4}$–$\frac{1}{3}$ in., hispid.

2. **L. tenuiflorum,** *Linn. f. Suppl.* 130; strigose, leaves oblong-linear lower spathulate scarcely petioled, corolla blue rarely white tube slightly exceeding the calyx, nutlets ovoid somewhat suddenly acuminate tuberculate. *Jacq. Ic. Rar.* ii. t. 313; *DC. Prodr.* x. 75; *Boiss. Fl. Orient.* iv. 217. Myosotis tenuiflora, *Viv. Fl. Lib.* 9, t. 1, *fig.* 2.

KASHMIR, alt. 5–7000 ft., *Thomson*. PUNJAB, Rawul Pindee, *Aitchison*.—DISTRIB. Cabul, W. Asia to Egypt and Greece.

Very near the preceding species. *Stems* often divided near the base, decumbent, rarely more than 12 in.

3. **L. officinale**, *Linn.*; *DC. Prodr.* x. 76; hispidly hairy, leaves oblong-lanceolate, corolla white fading yellowish, nutlets ovoid shining white smooth. *Engl. Bot.* t. 134; *Boiss. Fl. Orient.* iv. 218. Margarospermum officinale, *Dcne. in Jacquem. Voy. Bot.* 122.

KASHMIR; alt. 5–8000 ft., frequent; *Falconer, Thomson*, &c.

Perennial. *Stems* 2–4 feet, erect, corymbose upwards. *Leaves* 2 by $\frac{1}{2}$ in., rough strigose, nerves subprominent. *Racemes* in fruit 1–4 in.; pedicels $\frac{1}{8}$ in.; bracts leaflike, smaller upwards. *Corolla* $\frac{1}{4}$ in., hairy upwards. *Nutlets* $\frac{1}{8}$ in.; sepals in fruit $\frac{1}{4}$ in.

29. SERICOSTOMA, *Stocks*.

Small strigose branched shrubs. *Leaves* alternate. *Flowers* small, axillary, sessile, solitary, or the upper in a bracteate raceme. *Sepals* 5, narrow. *Corolla-tube* short; mouth wide, closed with hair; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, subincluded; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma subcapitate. *Nutlets* 4, ovoid, substipitate; scar basal; receptacle flat.—Species 3 in W. Asia, from India to Arabia.

1. **S. pauciflorum,** *Stocks in Wight Ic.* t. 1377; roughly strigose, leaves oblong subsessile, corolla white, nuts ovoid acute stony blotched with very flat white tubercles. *Dalz. & Gibs. Bomb. Fl.* 172; *Hook. Ic. Pl.* t. 804.

W. INDIA; Deesa. KATTYWAR (in the sands near the sea). SCINDE; *Stocks*, &c.

Attaining 12–18 in., oftener small, scrubby. *Leaves* $1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., obtuse with a minute mucro, narrowed at the base, hispid with tubercle-based hairs; in scrubby plants $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Sepals* $\frac{1}{6}$ in., lanceolate, hispid. *Corolla* $\frac{1}{4}$ in. diam., lobes crisp subserrulate on the margin; tube within and base of the lobes densely hairy. *Nutlets* $\frac{1}{10}$ in., acute.

30. ARNEBIA, *Forsk.*

Annual or perennial hispid herbs, diffuse or divided near the base; root often staining red. *Leaves* alternate. *Racemes* terminal, elongate, bracteate; flowers subsessile, yellow or whiteish (in the Indian species). *Sepals* linear, not or slightly enlarged in fruit (in the Indian species). *Corolla-tube* slender, longer than the sepals, throat naked within; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5; much below the mouth of the tube with long style, or in the throat semi-exsert with short style; anthers small, oblong obtuse. *Ovary* deeply 4-lobed; style shortly bipartite, stigmas small capitate, nearly the same in the long- and short-styled flowers. *Nutlets* 4, ovoid-oblong or acute, erect;

scar basal, large, triangular, flat, shortly produced up the inner face.—Species 12; in N. Africa, W. and Central Asia.

1. **A. hispidissima**, *DC. Prodr.* x. 94; very hispid, leaves lanceolate, sepals $\frac{1}{5}$ in., corolla-tube $\frac{1}{3}$ in., nutlets $\frac{1}{20}$–$\frac{1}{16}$ in. ovoid-conic sharply tuberculate on all sides. *Wight Ic.* t. 1393; *Boiss. Fl. Orient.* iv. 213; *Clarke in Journ. Linn. Soc.* xviii. 524. Dioclea hispidissima, *Spreng. Syst.* i. 556. Lithospermum hispidissimum, *Lehm. Ic.* t. 39. L. vestitum, *Wall. Cat.* 941; *Benth. in Royle Ill.* 305. Echiochilon hispidissimum, *Tausch. in Flora,* 1829, 643. Strobila hispidissima, *G. Don Gen. Syst.* iv. 327.

WESTERN INDIA, alt. 500–3000 ft.; from the Upper Gangetic plain and Rajpootana westwards, frequent.—DISTRIB. W. Asia to Egypt and Nubia.

Annual and (at least) biennial, diffuse, 3–15 in.; hairs white, harsh, spreading from tubercular bases. *Leaves* 2 by $\frac{1}{5}$ in. *Spikes* 2–4 in., one-sided; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., linear. *Corolla* yellow, mouth $\frac{1}{4}$ in. diam.—Dimorphic; the plants with stamens subexsert about as numerous as those with anthers below the corolla-throat.

2. **A. Griffithii**, *Boiss. Fl. Orient.* iv. 213; patently hispid, leaves lanceolate, sepals $\frac{1}{3}$–$\frac{1}{2}$ in., corolla-tube $\frac{3}{4}$–1 in., nutlets $\frac{1}{10}$ in. ovoid suddenly narrowed upwards obtusely tuberculate on all sides. *Bot. Mag.* t. 5266. A. echioides, *Hook. Bot. Mag.* t. 4409, *not of l. c.*—Arnebia sp. n. 5, *Herb. Ind. Or. H. f. & T.*

PUNJAB; Peshawur, *Vicary.* SCINDE; *Col. Thompson.*—DISTRIB. Beloochistan, Cabul.

Annual, diffuse, 3–6 in.; hairs white, spreading, from tubercular bases. less harsh than in *A. hispidissima. Leaves* 2 by $\frac{1}{4}$ in. *Spikes* 1–3 in., one-sided. *Corolla* yellow, lobes on expansion with 5 dark brown spots at the sinus, which disappear as the day advances, mouth $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Nuts* much larger than those of *A. hispidissima*, more triangular in horizontal section. Dimorphic.

3. **A. Thomsoni,** *Clarke*; shaggy hispid, leaves narrowly oblong, sepals $\frac{1}{5}$ in., corolla-tube $\frac{1}{3}$ in., nutlets $\frac{1}{10}$ in. ovoid-conic without tubercles.—Arnebia sp. n. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Piti Valley, *Thomson*; Leh, *Lance.*

Biennial or perennial, diffuse, 3–10 in.; hairs white, long, dense, softer and more numerous than in *A. hispidissima. Leaves* 1$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in. *Spikes* 1–2 in., dense; bracts oblong, obtuse, overtopping the sepals. *Corolla* nearly as of *A. hispidissima. Nutlets* gradually narrowed upwards, trigonous in horizontal section.—Stems and spikes much more villous than those of *A. hispidissima,* and the nutlets larger, smooth. Dimorphic.

4. **A. tibetana,** *Kurz in Journ. As. Soc.* 1874, pt. ii. 189; hispid, leaves narrowly oblong, sepals $\frac{1}{4}$–$\frac{1}{3}$ in., corolla-tube $\frac{1}{3}$–$\frac{1}{2}$ in., nutlets $\frac{1}{10}$ in. ovoid-conic scabrous.—Arnebia sp. n. 7, *Herb. Ind. Or. H. f. & T.*

NORTH KASHMIR and WESTERN TIBET, alt. 7–12,000 ft., frequent; *Thomson, Jaeschke, Aitchison,* &c.—DISTRIB. Kashgar, Yarkand.

Rootstock perennial, staining red.—Closely resembling *A. Thomsoni*; but more hispid, less villous; the spikes often elongate, the sepals somewhat widened in fruit, the nutlets minutely tuberculate. Dimorphic.

31. MACROTOMIA, *DC.*

Erect, hispid, perennial herbs. *Leaves* alternate, oblong or linear. *Spikes* dense, or in fruit elongate. *Sepals* 5, linear, long, more or less accrescent in fruit. *Corolla* (in the Indian species); tube narrow, long; throat naked; lobes 5, imbricate in bud, round, spreading. *Stamens* 5; anthers oblong, obtuse, in

the throat of the corolla, with the stigma in the middle of the tube; or anthers in the middle of the corolla-tube with the stigma at the mouth. *Ovary* deeply 4-lobed; style filiform, 2-fid with 2 capitate stigmas, or entire with a 2-lobed stigma. *Nutlets* 4, ovoid, rugose, trigonous; scar basal, large flat.—Species 6; Himalaya, Siberia, the Caucasus.

The character of the stigma, by which Bentham mainly separated *Arnebia* from *Macrotomia* is largely sexual; there is, however, no difficulty in separating the Indian species, the Arnebias having yellow flowers, the Macrotomias purple.

1. **M. Benthami,** *DC. Prodr.* x. 26; erect, tall, simple, hispid, leaves narrow-lanceolate, spike terminal solitary, sepals 1–1½ in. linear. *Clarke in Journ. Linn. Soc.* xviii. 524. Echium Benthami, *Wall. Cat.* 931; *G. Don Gen. Syst.* iv. 333. Leptanthe macrostachya, *Klotzsch in Reis. Pr. Waldem. Bot.* 95, t. 63.

WESTERN HIMALAYA, from Kumaon to Kashmir, alt. 10–13,000 ft., frequent; *Wallich, Falconer*, &c.—DISTRIB. Cabul.

Stem 1–3 ft. *Radical leaves* 11 by ½ in., cauline 3 by ½ in., acute. *Spike* 12 by 2–3 in., usually very dense. *Corolla-tube* ⅔ in.; mouth in diam. ¼–⅓ in. *Style* shortly bifid, stigmas 2 capitate. *Nutlets* ⅙ in., ovoid, suddenly acute, nearly as broad as long.

2. **M. perennis,** *Boiss. Fl. Orient.* iv. 212, note; stems solitary or several undivided hirsute, leaves oblong, cymes compound, spikes short many-flowered or subcapitate, sepals ⅓–¾ in. lanceolate-linear. *Clarke in Journ. Linn. Soc.* xviii. 525. M. endochroma, *H. f. & T. ms.*; *Henderson Yarkand*, 328; *Aitchison in Journ. Linn. Soc.* xviii. 81, *name only.* M. onosmoides, *Regel & Smirnow in Reg. Descr. Pl.* vi. 50. Stenosolenium perenne, *Schrenk*; *Fisch. & Mey. Enum. Fl. Schrenk*, 34. Lithospermum euchromon, *Royle Ill.* 305; *DC. Prodr.* x. 82. Arnebia perennis, *A. DC. Prodr.* x. 95.

ALPINE WESTERN HIMALAYA and WESTERN TIBET, alt. 10–14,000 ft., from the Karakorum and Kashmir to Kumaon, frequent; *Royle, Thomson*, &c.—DISTRIB. Cabul, Kashgar, Yarkand, Alatau Mts.

Root perennial; stems 8–20 in. *Radical leaves* 5 by ⅓ in., striated; cauline 1–2 in., sessile. *Cymes* 3–4 in. diam., many-flowered, pedicels 0–⅓ in. in *M. endochroma*, H. f. & T.; or condensed capitate few-flowered in Royle's examples on which *Lithospermum euchromon*, Royle, was founded. *Sepals* ⅓–½ in. in flower, patently hirsute, in fruit sometimes nearly 1 in. and sublanceolate. *Corolla-tube* as long as the sepals in flower or exceeding them by $\frac{1}{10}$–$\frac{1}{5}$ in.; lobes ⅙ in., varying in breadth. *Flowers* dimorphic, one form having ½ exserted anthers, and short 2-lobed stigmas, the other with included anthers between the capitate stigma. (See *Fisch. & Mey. l. c.*) *Nutlets* nearly as in *M. Benthami*, but larger.—There is difficulty about the specific name of this species; *M. endochroma, H. f. & T.* is a name published without a description, and it is not known whether it was an error for *M. euchroma* or whether it was intended to imply a species closely allied to *Lithospermum euchromum*. *M. cyanochroa, Benth.* (= Munbya cyanochroa, Boiss. Fl. Orient. iv. 212. Arnebia tingens, A. DC. Prodr. x. 96), does not differ from *M. perennis*, but by being more coarsely hispid; it is frequent in Cabul and Persia.

32. **ONOSMA,** *Linn.*

Hispid herbs or undershrubs. *Leaves* alternate. *Racemes* simple or cymose, one-sided, bracteate. *Flowers* yellow or purple, sessile or shortly pedicelled. *Calyx* 5-partite or 5-fid; segments acute, in fruit sometimes enlarged. *Corolla* tubular or ventricose, throat dilated or contracted; lobes 5, very short. *Stamens* 5, filaments attached near the middle of the corolla-tube linear short or long or greatly dilated at the base; anthers lanceolate, acuminate, free, conically

connivent, included or half-exserted. *Ovary* deeply 4-lobed; style filiform, stigma capitate or obscurely 2-lobed. *Nutlets* 4, ovoid, acute, erect or somewhat incurved, smooth or tuberculate; scar basal, large, flat.—Species 70, of the Mediterranean region and Central Asia.

SECT. 1. **Euonosma.** *Calyx lobes* in fruit much longer than the tube. *Corolla* tubular or somewhat widened upwards. *Filaments* not dilated at the base.

1. **O. echioides,** *Linn.*; *DC. Prodr.* x. 61; patently hispid, leaves oblong, racemes elongate often forked, calyx-lobes $\frac{1}{3}$ in. narrowly oblong, corolla $\frac{3}{4}$ in. cylindric slightly dilated upwards yellow, nutlets shining smooth. *Lamk. Ill.* t. 93; *Sibth. Fl. Græc.* t. 172; *Jacq. Fl. Austr.* t. 295; *Boiss. Fl. Orient.* iv. 181. O. hispida, *Wall. Cat.* 938; *DC. Prodr.* x. 66. O. arenarium, *Waldst. & Kit. Pl. Hung.* iii. t. 279. O. Gmelini, *Ledeb. Fl. Alt.* i. 184, and *Ic. Fl. Ross.* iii. t. 280.

KASHMIR, alt. 5–9000 ft., frequent, *Thomson*, &c. KUMAON; *Royle.*—DISTRIB. From Siberia and Cabul to France.

Biennial; stems 8–20 in. *Cauline leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in. *Racemes* in fruit 1–6 in.; bracts $\frac{1}{3}$–1 in., leaflike; pedicels 0–$\frac{1}{2}$ in. *Calyx-lobes* in fruit attaining sometimes 1 in. *Corolla* $\frac{1}{4}$ in. diam. at top, glabrous without. *Filaments* linear, anthers included or shortly exserted. *Style* overtopping the anthers. *Nuts* $\frac{1}{5}$–$\frac{1}{4}$ in. long, stony, white, often speckled.

2. **O. Hookeri,** *Clarke*; hirsute, leaves oblong, racemes subcapitate, calyx-lobes $\frac{1}{3}$ in. linear silky, corolla $\frac{3}{4}$ in. cylindric dilated upwards, nutlets muricated on the sides.—Onosma, sp. n. 2, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM, alt. 12–14,000 ft.; Kongra Lama and Tungu, *J. D. H.*

Rootstock perennial; stems 3–7 in. *Radical leaves* 3 by $\frac{1}{3}$ in.; cauline 1–2 by $\frac{1}{4}$ in., somewhat distant. *Flowers* in a single terminal villous head. *Calyx-lobes* in fruit $\frac{3}{4}$ in., very silky. *Corolla* silky without, apparently purple; upper half $\frac{1}{5}$ in. diam., nearly twice as wide as the lower. *Stamens* and *style* nearly as of *O. echioides. Nutlets* scarcely $\frac{1}{8}$ in., ovoid, suddenly narrowed, somewhat incurved, shining, and nearly smooth on the back.—Affords the best Lepcha red dye.

3. **O. Thomsoni,** *Clarke*; hirsute, leaves linear white woolly beneath, racemes small divided calyx-lobes $\frac{1}{3}$ in. linear, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. cylindric slightly dilated upwards, nutlets shining glabrous.—Onosma sp. n. 3, *Herb. Ind. Or. H. f. & T.*

KASHMIR, alt. 6000 ft.; Banahal, *Thomson.*

Perennial; stems 1–2 ft., patently hairy. *Cauline leaves* $1\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., hispid above with tubercular-based hairs. *Racemes* 1–3 in., capitate or in fruit lax; bracts $\frac{1}{3}$ in., linear; pedicels 0–$\frac{1}{4}$ in. *Calyx-lobes* scarcely enlarged in fruit. *Corolla* minutely hairy, mouth $\frac{1}{8}$–$\frac{1}{6}$ wide. *Anthers* more than half their length exsert; style overtopping the stamens. *Nutlets* $\frac{1}{8}$ in., ovoid, very acute, somewhat incurved, sides obscurely angular.

4. **O. bracteatum,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 13; and *Cat.* 936; hirsute, leaves lanceolate upper ovate-lanceolate silky white beneath, racemes capitate, calyx-lobes in fruit 1 in. linear silky, corolla-tube $\frac{1}{2}$ in. slightly dilated upwards, nutlets ovoid rough. *DC. Prodr.* x. 66. O. macrocephala, *Don Prodr.* 99.

WESTERN HIMALAYA; Kashmir, *Royle.* Kumaon, alt. 11,500 ft.; Pindari, *Strachey & Winterbottom.*

Stems 15 in., erect, stout, patently hispid. *Radical leaves* 6 by 1 in., petioled; cauline 2 by $\frac{2}{3}$ in., acuminate, upper surface hispid with tubercular-based hairs. *Flowers* in dense silky heads 2–3 in. diam. *Corolla* $\frac{1}{6}$ in. diam. at the mouth, hairy

without, a ring of hairs at the base within, purple (?). *Anthers* included, filaments linear. *Nutlets* $\frac{1}{8}$ in., acute.

5. **O. bicolor,** *Wall. Cat.* 939; hispid, cauline leaves spathulate-oblong uppermost elliptic sessile, racemes small divided, calyx-lobes $\frac{1}{5}$ in. lanceolate, corolla $\frac{1}{3}$ in. tubular purple, nutlets obscurely minutely rough. Maharanga bicolor, *A. DC. Prodr.* x. 71.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim at Lachen, alt. 10,000 ft.; *J. D. H.*

Stems 12–18 in., suberect, patently hispid. *Cauline leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in., subobtuse, much narrowed at the base, hispid with tubercle-based hairs above, whiter more silky beneath. *Cymes* 1–2 in.; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{5}$ in. *Calyx-tube* $\frac{1}{8}$ in. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., hairy without, purple. *Anthers* included; filaments linear not dilated downwards. *Nutlets* $\frac{1}{10}$ in., ovoid, scarcely acute.

SECT. 2. **Maharanga.** *Calyx-tube* distinct, widened in fruit. *Corolla* ventricose, distinctly narrowed at the mouth. *Filaments* very much dilated downwards.

6. **O. Emodi,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 11, *not Wall. Cat.*; hispid, leaves oblanceolate, calyx-lobes a little shorter than the corolla-tube, in fruit spreading broad-lanceolate. O. vestitum, *Wall. Cat.* 937. Maharanga Emodi, *A. DC. Prodr.* x. 71.

ALPINE HIMALAYA, alt. 10–13,000 ft.; Gurwhal, *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, frequent.

Stems 6–18 in., suberect, patently hairy. *Cauline leaves* attaining 6 by $\frac{3}{4}$ in., subobtuse, hispid on both surfaces; uppermost 2 in., elliptic, sessile. *Flowers* capitate or in fruit cymose; bracts $\frac{1}{3}$ in., narrowly lanceolate; pedicels 0–$\frac{1}{4}$ in. *Calyx* $\frac{1}{3}$ in. diam. in fruit, lobes hardly twice as long as the tube, with long white hairs within. *Corolla* $\frac{1}{3}$ in., minutely hairy, purple. *Anthers* included. *Style* exsert. *Nutlets* $\frac{1}{8}$ in., muricate, tubercular.

7. **O. Wallichianum,** *Benth in Gen. Pl.* ii. 864; hispid, leaves spathulate lanceolate, calyx less than half the length of the corolla, lobes in fruit acutely lanceolate from a triangular base. O. Emodi, *Wall. Cat.* 940. Maharanga Wallichiana, *A. DC. Prodr.* x. 71.

NEPAL; *Wallich.*

This is perhaps as Wallich estimated it, a mere form of *O. Emodi*, which is a very variable plant. *Corolla, stamens, filaments* and *nutlets* are the same.

ORDER CI. **CONVOLVULACEÆ.** (By C. B. Clarke.)

Herbs or shrubs, often twining, very rarely trees. *Leaves* alternate, exstipulate, in *Cuscuta* 0. *Cymes* 1- or more-flowered; bracteate. *Flowers* regular, hermaphrodite, often showy, 5- (rarely 4-) merous. *Calyx* deeply 5-lobed, persistent, sometimes much enlarged in fruit. *Corolla* campanulate or funnel-shaped, rarely subrotate; limb shortly or deeply lobed, often 5-plaited in the bud. *Stamens* 5, on the corolla-tube; anthers oblong, dehiscing longitudinally. *Ovary* superior, often surrounded by an annular disc, of 2 carpels, 2-celled or by false dissepiments 4-celled; style 1 rarely 2, stigma capitate 2-lobed, or 2-branched; ovules 2 in each carpel, sessile, erect, anatropous. *Fruit* indehiscent, or 2–4-valved or circumsciss or breaking up irregularly, 4–2 rarely 1-seeded. *Seeds* erect, albumen 0 or scanty; cotyledons generally plaited, rarely flat; radicle next the hilum.—Species 800, more abundant in warm regions.

The following genera are expected to occur in British Burma.

Dichondra repens, *Forst*, found in Mts. beyond Ava by Wallich, belongs to a small group of *Convolvulaceæ*, with a deeply 2–4-lobed ovary with basilar style, and a fruit of 2–4 utricles; it is a small creeping herb with cordate or reniform leaves, and small solitary axillary flowers. It is a native of warm countries in the old and new worlds.

Blinkworthia lycioides, *Choisy* (DC. Prodr. ix. 334), a very imperfectly known genus from near Ava. An erect villous shrub, with linear leaves glabrous above and subsilky beneath, short 1-fld. peduncles, 3 involucriform bracts, 5 sepals, a small urceolate corolla, 2-lobed stigma and 1-seeded berry.

TRIBUS 1. **Convolvuleæ.** *Corolla-limb* plaited or induplicate in bud.

* *Fruit indehiscent.*

Stigma large, globose, subsessile	1. ERYCIBE.
Stigmas 2, linear-oblong	2. RIVEA.
Ovary 4-celled; style long, stigmas 2	3. ARGYREIA.
Ovary 2-celled; style long, stigmas 2	4. LETTSOMIA.

** *Capsule 2–4-valved, or fragile and breaking up.*

Stigmas 2-globose. Filaments linear or dilated near the base. .	5. IPOMÆA.
Stigmas 2-globose. Filaments with an oblong process near the base	6. LEPISTEMON.
Ovary 1-celled. Stigmas short-oblong. Bracts shorter than the calyx	7. HEWITTIA.
Ovary 1-celled. Stigmas short-oblong. Bracts enclosing the calyx	8. CALYSTEGIA.
Ovary 2-celled. Style 1. Stigmas short-oblong	9. CONVOLVULUS.
Ovary 2-celled. Styles 2, each with 2 linear stigmas	10. EVOLVULUS.
Sepals in fruit enlarged, scarious. Capsule 1-seeded.	11. PORANA.
Styles 2, or 1 deeply 2-partite; stigmas capitate	12. BREWERIA.
Styles 2. Bract in fruit large, orbicular flat, reticulated . . .	13. NEUROPELTIS.

TRIBUS 2. **Cresseæ.** *Corolla-lobes* imbricate in bud.

Leaves small, sessile. Sepals distinct. Styles 2	14. CRESSA.

TRIBUS 3. **Cuscuteæ.** Leafless, yellow, twining parasites.

Corolla small, campanulate or ovoid	15. CUSCUTA.

1. ERYCIBE, *Roxb.*

Scandent or diffuse shrubs, or erect trees; shoots rusty-tomentose. *Leaves* from ovate to narrow-oblong, acuminate, entire, coriaceous. *Cymes* short, axillary or in terminal racemes or panicles; bracts usually inconspicuous. *Sepals* subequal, orbicular, coriaceous, adpressed to the base of the fruit. *Corolla* white or yellowish; tube shortly campanulate, densely hairy; limb plaited in bud, glabrous, lobes subbilobed, entire or serrate. *Stamens* on the corolla throat, filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled, 4-ovuled; style 0, stigma large subglobose 2-lobed or -partite. *Berry* fleshy, ovoid or ellipsoid, 1-seeded. *Albumen* scanty, irregularly intruded between the plicate fleshy cotyledons; radicle inferior.—Species 20; from India to Australia.

* *Cymes in terminal racemes or panicles, sometimes also axillary.*

1. **E. paniculata,** *Roxb. Cor. Pl.* ii. 31, t. 159, and *Fl. Ind.* i. 585, and *ed. Carey & Wall.* ii. 284; branchlets angular, leaves obovate or obovate-oblong abruptly acuminate base attenuate, cymes in narrow terminal panicles, berry ½ in. ellipsoid. *Wall. Cat.* 1330; *Wight Ill.* t. 180; *Chois. in Ann. Sc. Nat.* 2,

i. 222; *DC. Prodr.* ix. 464, *exclud. var.*; *Dalz. & Gibs. Bomb. Fl.* 169; *Brand. For. Fl.* 344; *Miq. Fl. Ind. Bat.* ii. 1032; *Benth. Fl. Austral.* iv. 411; *Kurz For. Fl.* ii. 214. E. Rheedii, *Blume Bijd.* 1047. Erimatalia Rheedii, *Roem. & Sch. Syst.* v. 331. Catonia glauca, *Vahl in Skrift Kiobenh.* vi. 99.—*Rheede Hort. Mal.* vii. t. 39.

THROUGHOUT INDIA, from Oudh eastward and southward to Ceylon, Tenasserim and the Nicobars; ascending the Himalaya to 4000 ft..—DISTRIB. Malaya, Australia.

A diffuse or subscandent shrub, or an erect tree 40 ft. *Leaves* 5 by 2 in., glabrescent; nerves 5–7 pairs, distinct above; petiole $\frac{1}{3}$ in. *Panicles* 7 by $1\frac{1}{2}$ in.; bracts inconspicuous; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. *Sepals* $\frac{1}{10}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., yellowish.—Roxburgh's plant was a diffuse or subscandent shrub, with rusty shoots; the Central Indian is an erect tree with pendent branchlets and racemes, and grey pubescence.

VAR. *Wightiana,* leaves elliptic cuneately acuminate at both ends or lanceolate coriaceous, primary nerves obscure above, secondary prominent much reticulated beneath, axillary cymes often 3–5 in. elongate raceme-like or terminal panicle broad, flowers white sweet-scented. E. Wightiana, *Grah. Cat. Bomb. Pl.* 137; *Dalz. & Gibs. Bomb. Fl.* 170; *Brand. For. Fl.* 344. Catonia elliptica, *Vahl in Skrift. Kiobenh.* vi. 101.—W. Deccan Peninsula, from Bombay to Cochin; common.

VAR. *peguensis*; leaves elliptic cuneately acuminate at both ends, secondary nerves not prominently reticulate beneath, panicles terminal large, branches long or short, flowers white.—Chittagong; *J. D. H.* Moulmein; *Griffith, Falconer, Parish.*

2. **E. expansa,** *Wall. Cat.* 1331; branchlets angular rusty-tomentose, leaves elliptic acuminate base rounded or subcordate, cymes in terminal racemes or panicles often prominently bracteate. *G. Don Gen. Syst.* iv. 392. E. ferruginosa, *Griff. Notul.* iv. 283. E. paniculata, *var.* β expansa, *Chois. in Ann. Sc. Nat.* 2, i. 222; *DC. Prodr.* ix. 464.

PEGU and TENASSERIM; *Wallich.*

Panicles mostly large, broad (whence the name *E. expansa*); bracts $\frac{1}{2}$–1 by $\frac{1}{3}$ in., foliaceous. *Berry* not seen.—Perhaps a form of *E. paniculata,* but the base of the leaf is always rounded or subcordate, which it never is in *E. paniculata.*

3. **E. subspicata,** *Wall. Cat.* 1332; branchlets angular rusty-tomentose, leaves elliptic or lanceolate acuminate, cymes peduncled subspicate, berry $\frac{1}{2}$–$\frac{2}{3}$ in. elliptic-oblong. *G. Don Gen. Syst.* iv. 392.

SILHET, *Wallich.* KHASIA MTS., *Griffith, J. D. H.*—DISTRIB. Ava.

Leaves 4 by $1\frac{3}{4}$ in., less abruptly acuminate than in *E. paniculata,* not at all obovate, rhomboid or rounded at the base, coriaceous, nerves obscure above.—Perhaps only a variety of *E. paniculata*; but the specimens are very uniform.

4. **E. glaucescens,** *Wall. Cat.* 1334; nearly glabrous except the corolla, leaves elliptic acuminate base cuneate, cymes axillary often half as long as the leaves and in elongate terminal panicles. *Chois. in Ann. Sc. Nat.* 2, i. 223; *DC. Prodr.* ix. 464; *Kurz For. Fl.* ii. 214. E. lævigata, *Wall. Cat.* 1333 *b*; *Chois. in Ann. Sc. Nat.* 2, i. 223, *partly*; *DC. l. c. partly.*

SILHET and MOULMEIN, *Wallich.* CACHAR; *Keenan.*

Differs from *E. paniculata,* var. *peguensis,* only by the branchlets and young panicles being very nearly glabrous. *E. glaucescens* of DC., with the racemes sparingly rufous-silky, and *E. glaucescens,* Kurz, with the young shoots rusty-pilose, may include, wholly or partially, *E. lævigata.* Keenan refers to his plant as "a tall erect tree with white scented flowers."

5. **E. lævigata,** *Wall. Cat.* 1333, *a only*; branchlets angular slightly pubescent, leaves elliptic or oblong acuminate base cuneate, cymes short axillary towards the end of the branches and terminal scarcely panicled, berry $\frac{3}{4}$ in.

globose, *Chois. in Ann. Sc. Nat.* 2, i. 223, *partly*; *DC. Prodr.* ix. 464, *partly.* —Erycibe, n. 8, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5–6000 ft., *Herb. Griffith, King,* &c. KHASIA MTS., alt. 4000 ft., *Wallich, Griffith, J. D. H.*

A rambling, stout shrub; branchlets thick. *Leaves* 5 by 1½ in., coriaceous; nerves 8–20 pair; petiole ⅓ in. or longer. *Cymes* hardly half so long as the leaves, rusty-tomentose, terminal hardly larger than the axillary. *Flowers* yellowish-white, as of *E. paniculata,* but larger.—This is distinguished from the four preceding by its thick branchlets, larger flowers and fruits, the nerves appear very variable in number, but always more numerous than in *E. paniculata.*

** *Cymes axillary short, terminal (if any) scarcely larger than the axillary.*

6. **E. malaccensis,** *Clarke*; leaves elliptic or obovate-oblong acuminate coriaceous base cuneate or rounded, nerves distinctly reticulated raised beneath, cymes and sepals uniformly closely fulvous tomentose, berry ⅔ in. subquadrate ellipsoid.—Erycibe n. 7, *Herb. Ind. Or. H. f. & T.*

MOULMEIN, *Lobb.* MALACCA, *Griffith, Maingay.*

A large scandent shrub; innovations fulvous-pubescent; branchlets obscurely angular. *Leaves* 3 by 1¼ in.; petiole ⅙–¼. *Cymes* ½–2 in. *Sepals* not glabrescent upwards. *Flowers* nearly as of *E. paniculata.*

7. **E. Princei,** *Wall. Cat.* 1335; innovations rusty-pubescent, leaves short-petioled obovate-oblong abruptly acuminate base obtuse, cymes subcapitate axillary and terminal subspicate or racemose, berry ½ in. ellipsoid. *Chois. in Ann. Sc. Nat.* 2, i. 224; *DC. Prodr.* ix. 464. E. camptobotrya, *Miq. Fl. Ind. Bat. Suppl.* 578.

PENANG, *Wallich.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Banca, Borneo.

A powerful scandent, sometimes twining, shrub; branchlets scarcely angular, obscurely rusty-pubescent. *Leaves* 4 by 1¾ in., coriaceous, suddenly narrowed at the base, sometimes subcordate; nerves 5–7 pairs, nerves obscure; petiole ⅕ in. *Cymes* scarcely 1 in. diam., subsessile, rusty-villous; bracts $\frac{1}{10}$ in., oblong. *Flowers* nearly as of *E. paniculata. Sepals* villous or glabrate, coriaceous.

8. **E. Griffithii,** *Clarke*; branchlets round glabrous, leaves large obovate-oblong abruptly acuminate base cuneate, cymes sessile small axillary lax few-fld. rufous-villous, berries 1 in. ellipsoid.

MERGUI, *Griffith* (Kew Distrib. n. 5880). MALACCA, *Maingay.*

A large, scandent shrub. *Leaves* 5½ by 2 in., coriaceous, nerves 6 pairs, secondary not prominent; petiole ¼ in. *Cymes* ½–¾ in., densely clothed with dark-red hair. *Berry* coriaceous, rough.

9. **E. Maingayi,** *Clarke*; innovations minutely hairy, leaves long-petioled elliptic acuminate to an obtuse apex base cuneate, cymes axillary small lax minutely rufous-pubescent.

MALACCA; *Maingay.*

A large, scandent shrub; branches round, glabrous or nearly so. *Leaves* 2½ by 1¼ in., nerves 6 pairs, secondary obscure; petiole ⅓ in. *Cymes* ½ in., deep red, appearing glabrous, but minutely adpressedly pilose under a lens.—This appears allied to *E. Princei*; but, besides the differences in indumentum, the long petioles give it a habit of its own.

10. **E. coriacea,** *Wall. Cat.* 1337; branchlets round glabrous or nearly so, leaves large elliptic acuminate very coriaceous, nerves obscure on both surfaces, cymes ½–2 in. minutely rusty-pubescent dense-fld. *Chois. in Ann. Sc. Nat.* 2, i. 224; *DC. Prodr.* ix. 465; *Kurz For. Fl.* ii. 213.

CHITTAGONG, *Wallich.*

Leaves 6½ by 2½ in., cuneate at the base, verrucose beneath; midrib strong, much raised beneath; petiole ⅔ in. *Berry* not seen.—There is no specimen of this in Wallich's Herbarium, nor have I seen any.

VAR. *fragrans*; leaves 5½ by 3¼ in. ovate-elliptic acuminate, cymes rather less dense than in *E. coriacea.* G. Don Gen. Syst. iv. 392. *E. fragrans*, Wall. Cat. 1336. —Amherst, *Wallich.*

11. **E. glomerata,** *Wall. Cat.* 1338 (? *of Blume*); innovations villous, leaves large elliptic acuminate nerves impressed above much raised beneath secondary obscure, cymes axillary sessile capitate. *Chois. in Ann. Sc. Nat.* 2, i. 224; *DC. Prodr.* ix. 465; *Kurz For. Fl.* ii. 213. E. citriniflora, *Griff. Notul.* iv. 284.—Ebenacea, *Wall. Cat.* 9061.

MOULMEIN, *Wallich.* MERGUI, *Griffith.*

A powerful scandent shrub; branchlets round, stout, soon glabrescent. *Leaves* 7 by 2½ in., narrowed downwards, but often shortly suddenly rounded at the very base, coriaceous, often rugose above from the strongly impressed nerves; petiole scarcely ¼ in. *Cymes* ½ in. diam., minutely closely rusty-tomentose. *Berry* not seen.—There is no specimen of this in Wallich's Herbarium. Miquel (*Fl. Ind. Bat.* ii. 1033) says that this plant is not *E. glomerata,* Blume Bijd. 1047; but from Blume's description it is either the same or very near it.

2. RIVEA, *Chois.*

Twining shrubs. *Leaves* ovate-cordate, silky or hirsute beneath, at least while young; petiole long. *Peduncles* axillary, 1–3-fld.; bracts 2–3, narrow. *Sepals* ovate or oblong, subequal. *Corolla* large, white, tube long, cylindric; limb wide-funnel-shaped, plaited. *Stamens* attached near the middle of the tube, included; anthers narrowly-oblong, obtuse, not finally twisting. *Ovary* 4-celled, 4-ovuled; disc annular; style filiform, stigmas linear-oblong. *Fruit* indehiscent or irregularly breaking up, subglobose, shining, nearly dry. *Seeds* 1–4, glabrous, in mealy pulp.—Species 2, Indian.

1. **R. ornata,** *Chois. Convolv. Or.* 27, t. 3, and in *DC. Prodr.* ix. 326; leaves orbicular-cordate white-tomentose beneath, peduncles short mostly 3-fld., sepals ½–¾ in. elliptic-oblong acute or subacute, corolla-limb white silky without. *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 1, and *Ill.* t. 168, *bis* fig. 1, and *Ic.* t. 1356; *Dalz. & Gibs. Bomb. Fl.* 168. Lettsomia ornata, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 496, and *ed. Carey & Wall.* ii. 85. Convolvulus candicans, *Roth Nov. Sp.* 106; *Roem. & Sch. Syst.* iv. 273, 790, *not of Sol.* C. ornatus, *Wall. Cat.* 1369. C. Tarita, *Ham.*; *Wall. Cat.* 2253. Argyreia ornata, *Sweet Hort. Brit.* ed. 2, 373; *Brand. For. Fl.* 343.

DECCAN PENINSULA; common in dry jungles, &c. CEYLON; in the hotter parts of the Island.

Branchlets stout, white-tomentose. *Leaves* 3–5 in. in diam., often broader than long, glabrous above and, sometimes, at length beneath; petiole 1–2 in. *Peduncles* ½ in or less; pedicels hardly any; bracts ½ in., narrowly oblong, deciduous. *Corolla-tube* 2 in., limb 2 in. diam. *Stigmas* $\frac{1}{10}$ by $\frac{1}{40}$ in. *Fruit* ⅔ in. diam., globose, mucronate by the style base, yellow-brown, nearly dry.—Roxburgh says he obtained seeds of this from Cawnpore (possibly from a garden ?); no examples have been seen but from the South Deccan.

VAR. *Griffithii*; leaves less silky beneath, peduncles 1–4½ in., sepals ½–¾ in. elliptic-oblong acute, corolla-limb glabrous without even in the bud.—BENGAL, *Griffith, Falconer.*—Possibly a cultivated form. One of Griffith's examples is from the Calcutta Botanic Garden, the other from Sikkim; Falconer's example is without locality.

2. **R. hypocrateriformis**, *Chois. Convolv. Or.* 26, and in *DC. Prodr.* ix. 326; leaves orbicular-cordate adpressedly silky beneath when young, sepals ¼ in. ovate-elliptic obtuse, corolla-limb glabrous or puberulous without. *Dalz. & Gibs. Bomb. Fl.* 168; *Miq. Fl. Ind. Bat.* ii. 584, *only copied.* R. bona-nox, *Roxb. Hort. Beng.* 13; *Chois. Convolv. Or.* 27, and in *DC. Prodr.* ix. 326; *Dalz. & Gibs. Bomb. Fl.* 168. R. fragrans, *Nimmo in Grah. Cat. Pl. Bomb.* 127. R. ornata, *Aitch. Cat. Punjab Pl.* 100, *not of Chois.* Convolvulus hypocrateriformis, *Lamk. Enc.* iii. 561. C. candicans, *Wall. Cat.* 1368; *Roem. & Sch. Syst.* iv. 302, *not of Roth.* Lettsomia uniflora, *Roxb. Cat. Pl.* (1813) and *Fl. Ind.* i. 495, and *ed. Carey & Wall.* ii. 85. L. bona-nox, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 494. Argyreia uniflora *and* bona-nox, *Sweet Hort. Brit. ed.* 2, 373; *Brand. For. Fl.* 343.

WESTERN INDIA; in dry forests, from Lahore and Behar to Mysore, common.—ASSAM, *Griffith.*

Generally resembling *R. ornata*, but the hair on the stems beneath the leaves and on the sepals is less copious, and much less white. The essential distinction lies in the sepals which are smaller and more obtuse.—Roxburgh's *Lettsomia bona-nox*, a native of Midnapore jungles, is referred to here with little doubt, though no specimens of it are known to exist; the only difference his characters afford between his *L. bona-nox* and his *L. uniflora* (*Rivea hypocrateriformis*) are, that the former has deliciously clove-scented flowers and three of them together, the latter solitary flowers, whether scented or no is not stated. Roxburgh's figure is excellent.

3. ARGYREIA, *Lour.*

Scandent, rarely suberect, shrubs. *Leaves* from cordate-ovate to narrow-lanceolate, silky hirsute or pubescent. *Cymes* sessile or peduncled, capitate or corymbose. *Flowers* showy, purple or rose, rarely white. *Sepals* from orbicular to lanceolate, subequal, or the inner smaller, adpressed to the fruit, often somewhat enlarged. *Corolla* funnel-shaped; limb plaited, very shortly lobed. *Stamens* included; anthers oblong, never twisting. *Ovary* completely 4-celled, 4-ovuled; disc annular, often prominent, as long as the ovary; style filiform, stigmas 2 sessile globose. *Fruit* indehiscent, baccate or nearly dry, hard or papery, 4–1-seeded.—Species 30, Indian, Malayan, and S. Chinese, one African.

SECT. I. **Pomifera.** *Sepals* orbicular, ultimately enlarged, completely enveloping the fruit, strongly imbricate, glabrous, mucilaginous.

1. **A. tiliæfolia**, *Wight Ic.* t. 1358; leaves ovate-cordate shortly acuminate or obtuse hoary beneath or glabrescent, peduncles 1–3-fld. shorter than the petioles, corolla-plaits glabrous without or nearly so. *Kurz For. Fl.* ii. 215. Convolvolus tiliæfolius, *Lamk. Enc.* iii. 544. C. gangeticus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 467, and *ed. Carey & Wall.* ii. 46; *Wall. Cat.* 1340. C. melanostictus, *Schldl. in Linnæa*, 1831, 737. Ipomæa tiliæfolia, *Roem. & Sch. Syst.* iv. 229. I. gangetica, *Sweet Hort. Brit. ed.* 2, 371. I. melanosticta, *G. Don Gen. Syst.* iv. 271. Rivea tiliæfolia, *Chois. Convolv. Or.* 25, and in *DC. Prodr.* ix. 325; *Hassk. Retzia*, i. 68.

INDIA, alt. 0–1000 ft., except in the western dry portion, very common in Bengal and near the sea.—DISTRIB. Malaya to the Philippines; elsewhere often cultivated.

Scandent or twining, often forming low, dense masses with apple-like fruits. *Leaves* 1–4 in. diam.; petiole long. *Peduncles* ½–3 in.; bracts inconspicuous, caducous. *Corolla* 2–3 in., widely-funnel-shaped, rose-purple. *Fruit* ¾–1½ in. diam., including the sepals; capsule thin. *Seeds* ⅓ in., minutely rusty-villous, hilum hirsute. —Miquel (*Fl. Ind. Bat.* ii. 587) says Ipomæa lilacina (*Blume Bijd.* 716) is this plant, but the description does not agree ("sepals acute," &c.).

SECT. II. **Euargyreia.** *Sepals* from ovate to narrow-oblong, more or less hairy, ultimately dry. *Seeds* glabrous or very closely tomentose.

* *Stems twining, often extensively scandent.*

2. **A. speciosa**, *Sweet Hort. Brit. ed.* 2, 373; leaves large ovate-cordate acute glabrous above persistently white-tomentose beneath, peduncles long, flowers subcapitate, bracts large ovate-lanceolate acute thin softly woolly deciduous, corolla-tube woolly, fruit brown-yellow stout nearly dry. *Chois. Convolv. Or.* 29, and in *DC. Prodr.* ix. 328; *Wight Ic.* t. 851; *Hassk. Retzia,* i. 68; *Dalz. & Gibs. Bomb. Fl.* 168; *Brand. For. Fl.* 343. Convolvulus speciosus, *Linn. f. Suppl.* 137; *Smith Ic. Pict.* t. 17; *Wall. Cat.* 1363. C. nervosus, *Burm. Fl. Ind.* 48, t. 20, fig. 1. Lettsomia speciosa, *Roxb. Hort. Beng.* 13. L. nervosa, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 488, and *ed. Carey & Wall.* ii. 78 (*not of Hort. Bot. Calc.*). Ipomæa speciosa, *Blume Bijd.* 717; *Bot. Mag.* 2446.

INDIA, alt. 0–1000 ft.; from Assam to Belgaum and Mysore; frequent in Bengal plain.—DISTRIB. Java; also from China, Mauritius, &c., cultivated.

Extensively climbing. *Stems* stout, white-tomentose. *Leaves* 3–12 in. diam., glabrous above even before unfolding; petiole long. *Peduncles* usually 3–6 in., stout, white-tomentose; outer bracts 1½ in. *Corolla* 2–3 in., tubular-funnel-shaped, rosy. *Fruit* ¾ in. diam., globose, apiculate; sepals ultimately ⅔ in. diam., ovate, coriaceous, woolly.

3. **A. argentea**, *Chois. Convolv. Or.* 36, and in *DC. Prodr.* ix. 330; leaves ovate-cordate acute hairy above persistently white-silky beneath, corymbs peduncled dense or subcapitate, bracts narrow mostly inconspicuous, corolla hairy without, berry nearly black, fruiting sepals thin lanceolate subpatent. Lettsomia argentea, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 489, and *ed. Carey & Wall.* ii. 79. Convolvulus argenteus, *Wall. Cat.* 1364.

BENGAL PLAIN; frequent, extending to Assam and Chittagong. KHASIA MTS., alt. 4000 ft., *H. f. & T.*

A large climber. *Leaves* 3–6 in., closely pilose above ultimately subglabrous, silky subtomentose beneath; petiole long. *Peduncles* 2–5 in.; corymbs small, or large; bracts ½ by ⅙ in., in the Khasia plant larger subpersistent. *Corolla* 2 in., tubular-funnel-shaped, with many spreading simple lax hairs without, rose-purple. *Berry* ⅔ in. diam., globose; sepals ultimately ½ by ⅙ in., subpatent, or in one example ovate subobtuse coriaceous.

VAR. *venusta*; indumentum less silvery ultimately thin. A. venusta, *Chois. Convolv. Or.* 36, and in *DC. Prodr.* ix. 330. Convolvulus festivus, *Wall. Cat.* 1414, not Argyreia festiva, *Wall. Pl. As. Rar.* Argyreia sp., n. 27, *Herb. Ind. Or. H. f. & T.* —PEGU, *Wallich, McLelland,* &c. BENGAL; Furidpore, *Clarke.*—DISTRIB. Ava.

4. **A. Roxburghii**, *Chois. Convolv. Or.* 37, and in *DC. Prodr.* ix. 330, *most syns. excl.*; leaves ovate-cordate acute softly patently villous on both surfaces, peduncles equalling the petioles, corymbs dense, bracts narrow, sepals ⅓–½ in. elliptic-lanceolate. Convolvulus Roxburghii, *Wall. Cat.* 1415.

NEPAL, *Wallich*; SIKKIM TERAI, *Clarke.* ASSAM, *Jenkins.*

Leaves hardly shining. *Peduncles* 2 in., shorter than in *A. argentea,* which it very closely resembles.

VAR. *ampla*; innovations white silky, leaves large ultimately sparsely hairy, cymes lax irregularly compound, one or more of the outer bracts often leaflike petioled. Argyreia ampla, *Chois. Convolv. Or.* 38, and in *DC. Prodr.* ix. Convolvulus amplus, *Wall. Cat.* 1420.—The common form.

5. **A. Hookeri**, *Clarke*; leaves large cordate-ovate acute glabrescent or somewhat hairy beneath, peduncles very long, cymes dichotomous few-flowered,

bracts caducous, sepals ovate- or oblong-lanceolate, berry dusky succulent completely 4-celled. A. populifolia, *Chois. in DC. Prodr.* ix. 329; and C. malabaricus, *Wall. Cat.* 1414 B; the Goalpara plant only.

ASSAM, *Hamilton*. SIKKIM HIMALAYA, alt. 1–4000 ft., frequent, *J. D. H.*, &c. BHOTAN, alt. 3000 ft., *Clarke*.

A large climber, ultimately glabrescent; innovations villous or sometimes shining, subsericeous. *Leaves* 4–9 in., larger deeply cordate; petiole long. *Peduncles* 31–2 in.; bracts $\frac{1}{2}$ in., narrow, caducous. *Sepals* $\frac{1}{3}$ in.; in fruit larger, acute. *Corolla* 2–2$\frac{1}{2}$ in., tubular-funnel-shaped, sparsely hairy without, rose-coloured. *Berry* $\frac{3}{4}$ in. diam., globose.—Convolvulus peduncularis, *Wall. Cat.* 1417, from Ava, is exceedingly like *A. Hookeri*; but in it the fruiting sepals are $\frac{1}{5}$ in., orbicular and coriaceous.

6. **A. splendens,** *Sweet Hort. Brit. ed.* 2, 373; leaves elliptic acuminate base rhomboid or rounded glabrous above silky-white beneath, corymbs peduncled, bracts caducous, corolla-plaits hairy without, capsule papery scarlet. Lettsomia splendens, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 487, and *ed. Carey & Wall.* ii. 75; *Wall. Cat.* 1361. Ipomæa splendens, *Bot. Mag.* t. 2628.

KHASIA MTS.; *Griffith*. CHITTAGONG; *Roxburgh*; at Seetakoond, *H. f. & T.*

A large climber. *Leaves* 7 by 4 in., never cordate; petiole 3 in. *Peduncles* 1–4 in., few- or many-flowered. *Sepals* $\frac{1}{4}$ in., ovate, obtuse, closely tomentose. *Corolla* 1$\frac{1}{2}$ in., tubular-campanulate, rose-coloured. *Fruit* (with the sepals) as of *A. Wallichii*. —*Convolvulus Finlaysonianus*, Wall. Cat. 6607, from Cochin-China, is closely allied, but the leaves are elliptic and ovate subcordate. *A. acuta*, Lour. (Chois. in DC. Prodr. xix. 333) is exceedingly near, but has the corymbs slenderer, smaller flowers, and sepals elliptic-oblong with adpressed silvery hairs.

7. **A. obtecta,** *Clarke*; leaves elliptic or oblong acute at both ends pilose above silky-strigose beneath, peduncles short, bracts caducous, sepals short ovate obtuse, corolla hirsute without, capsule papery red. Convolvulus obtectus, *Wall. Cat.* 1416. Rivea? obtecta, *Chois. Convolv. Or.* 28, and *in DC. Prodr.* ix. 326.

MALAY PENINSULA; Tavoy and Amherst, *Wallich*; Mergui, *Griffith*; Tenasserim, *Helfer*.

A large climber. *Leaves* 5 by 2$\frac{1}{4}$ in., beneath tawny or whiteish; petiole $\frac{2}{3}$ in. *Peduncles* $\frac{1}{2}$–1$\frac{1}{2}$ in. *Flower* and *fruit* nearly as in *A. splendens*, but sepals and corolla more hirsute. *Ovary* 4-celled, 4-ovuled.—Known from *A. splendens* by the short petioles, from *A. lanceolata* by the peduncled corymbs.

VAR. *obtusifolia*; leaves obtuse almost emarginate. Tavoy; *Griffith*.—An example in Herb. Wight, named by him *Convolvulus laurifolius*. This may be *A. obtusifolia*, Lour. (Chois. in DC. Prodr. ix. 333), of which the fragments at the British Museum consist of branchlets, fruits, and a fragment of one leaf.

8. **A. lanceolata,** *Chois. Convolv. Or.* 39, and in *DC. Prodr.* ix. 331; leaves lanceolate or linear-lanceolate pilose above shining silky beneath, flowers axillary subsessile 1–3 together, bracts inconspicuous, sepals elongate-oblong, corolla hairy without. Convolvulus argyrophyllus, *Wall. Cat.* 1395.

MALAY PENINSULA; Martaban and Tavoy, *Wallich*; Moulmein, *Parish*; Tenasserim or Andamans, *Helfer*.

Stems twining, slender. *Leaves* 5 by $\frac{2}{3}$ in., or shorter and broader, base cuneate or rounded; petiole $\frac{2}{3}$ in. *Sepals* $\frac{2}{3}$ by $\frac{1}{5}$ in., oblong or lanceolate. *Corolla* 1$\frac{1}{2}$ in., tubular-campanulate. *Capsule* $\frac{1}{4}$ in., globose, thin, not red (but unripe).—The foliage and corymbs are sometimes like those of *A. obtecta*, from which it is distinguished by the elongate sepals.

9. **A. Wallichii,** *Chois. Convolv. Or.* 39, and in *DC. Prodr.* ix. 331; leaves large ovate-cordate acute glabrous wrinkled above persistently tomentose beneath, peduncles very short, flowers capitate, bracts large persistent outer thinner often nerved. Convolvulus erythrocarpus, *Wall. Cat.* 1413. Lettsomia nervosa, *Hort. Bot. Calc.* and *Herb. Wight, not of Roxb.*

SIKKIM TERAI; *Clarke.*—DISTRIB. Ava.

A large climber. *Leaves* 4–10 in., upper surface wrinkled by the impressed secondary nerves; petiole 2–4 in. *Peduncles* 0–1 in.; heads 1–3 in. diam., dense, many-fld.; outer bracts 1 in. and upwards, ovate-oblong. *Sepals* 2–3 in., elliptic-oblong. *Corolla* $1\frac{1}{2}$ in., tubular-infundibuliform, hirsute, white tinged rose. *Capsule* $\frac{1}{3}$ in., depressed globose, becoming (together with the interior of the sepals) red, or (in the Sikkim example) a glistening white.

VAR. *coriacea*; leaves more leathery, sepals more leathery densely hairy not nerved, capsule red.—Sikkim, alt. 2-5000 feet, common; *J. D. H.*, *Treutler*, &c. Upper Assam; *Jenkins.*

10. **A. populifolia,** *Chois. Convolv. Or.* 32, and in *DC. Prodr.* ix. 329; leaves ovate acuminate base shallowly cordate or rounded glabrous or sparingly hairy beneath, peduncles shorter than the leaves, flowers subcapitate, bracts prominent linear-lanceolate persistent, sepals small subequal ovate obtuse. Ipomæa zeylanica, *Gaertn. Fruct.* ii. 482, t. 178, fig. 1; *Moon Cat. Pl. Ceyl.* 14, *not* Argyreia zeylanica, *Kurz.* Convolvulus festivus, *Wall. Cat.* 1414, *the Ceylon material only.* Rivea zeylanica var. *a* only, *Thwaites Enum.* 209, *many syn. excl.*

CEYLON; common; *Walker*, &c.

A large twiner, sparingly grey pilose or glabrate. *Leaves* 2–5 in. diam., long-petioled. *Peduncles* 1–7 in., usually exceeding the petioles; bracts numerous $\frac{1}{2}$–1 in., sparingly grey-pilose or glabrate. *Sepals* $\frac{1}{5}$ in., hardly larger in fruit. *Corolla* 2 in., funnel-shaped, rose-purple, hairy on the plaits without, ultimately nearly glabrescent. *Berry* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., dusky, pulpy.

VAR. *Thwaitesii*; leaves elliptic acute base rounded sparsely hirsute beneath, bracts elliptic oblong.—Ceylon; Colombo, *Thwaites* (C. P. n. 1943.)

VAR. *fastigiata*; corymbs many-fld., close not capitate. Convolvulus fastigiatus, *Wall. Cat.* 2258, *not of Roxb.* Ipomæa fastigiata, *Chois. in DC. Prodr.* ix. 380, the Bengal plant, *not of Sweet.*—Bengal (*Choisy*). The type (in Wallich's Herbarium), is a plant from the Calcutta Botanic Garden, and looks altogether like *A. populifolia* cultivated. A powerful twiner; stems sparsely hairy. *Leaves* 4 in., shallowly cordate, ovate, subacute, glabrous above, sparingly hairy beneath; petiole 2 in. *Peduncles* 3–8 in., strigose; corymbs 2–4 in. diam.; bracts 1 by $\frac{1}{4}$ in., lanceolate, persistent, a few outer sometimes leaflike and petioled. *Sepals* $\frac{1}{5}$ in. ovate, obtuse, adpressed villous. *Corolla* $2\frac{1}{2}$ in. and upwards, tubular-funnel-shaped, hairy without, rose-purple. *Fruit* not seen.

11. **A. involucrata,** *Clarke*; leaves ovate acuminate sparingly hairy or glabrescent, peduncles shorter than the leaves, flowers subcapitate, bracts large oblong persistent, sepals subequal ovate-lanceolate acuminate.—Argyreia n. 23, *Herb. Ind. Or. H. f. & T.*

WESTERN DECCAN PENINSULA; Concan and Bababoodan Hills, *Law*; Bombay, *Dalzell.*

A large twiner. *Leaves* $7\frac{1}{2}$ by $4\frac{1}{2}$ in., usually more elongate than *A. populifolia*, base rounded or shallowly cordate. *Peduncles* 2–6 in.; bracts 1 by $\frac{1}{6}$ in., sparingly hairy, flat. *Sepals* $\frac{1}{2}$ in., often caudate, margins scarious. *Corolla* and fruit nearly as of *A. populifolia.*—*Leaves* in one example of Dalzell's narrower, 5 by $1\frac{3}{4}$ in., base subrhomboid.

VAR. *inæqualis*; bracts large some attaining 2 by $\frac{3}{4}$ in., two outer sepals much longer than the inner, corolla exceeding $3\frac{1}{4}$ in.—The Concan, *Stocks.* Distrib.

Tropical Africa (if *A. populifolia*, var. *africana* (Oliver in Trans. Linn. Soc. xxix. 114) can be identified with any Indian plant).

12. **A. bracteata,** *Chois. Convolv. Or.* 39, and in *DC. Prodr.* ix. 328; leaves ovate base rounded glabrate above fulvous densely silky beneath, peduncles mostly short, flowers subcapitate, bracts prominent oblong or elliptic silkily villous persistent, sepals $\frac{1}{4}$ in. ovate subacute. *Wight in Hook. Comp. Bot. Mag.* i. 38, t. 3. Convolvulus pomaceus, *Wall. Cat.* 1419, *type sheet partly.* Ipomæa Kleiniana, *Roem. & Sch. Syst.* iv. 789.

DECCAN PENINSULA; *Rottler*; Madras, *Shuter*; Coimbatore, *Wight.*

Scandent. *Leaves* 2–3$\frac{1}{2}$ in., obtuse or scarcely acuminate, base sometimes slightly cordate; petiole 1 in. *Peduncles* $\frac{1}{2}$–2 in., bracts $\frac{3}{4}$ in. *Sepals* with scarious margins. *Corolla* 2 in. and upwards, tubular-campanulate, hirsute without. *Berry* $\frac{2}{3}$ in., yellowish-brown, pulpy.—Easily distinguished by its leaves being glabrous above shining silky beneath; hence often confounded with *A. argentea.*

13. **A. pomacea,** *Chois. Convolv. Or.* 31, and in *DC. Prodr.* ix. 329; leaves elliptic-ovate obtuse closely softly hairy on both surfaces, peduncles short, corymbs small lax, bracts narrowly oblong caducous, sepals $\frac{1}{4}$ in. round-ovate. *Wight Ill.* 168 *bis fig.* 2. Lettsomia pomacea, *Roxb. Hort. Beng.* 18, and *Fl. Ind.* i. 493, and *ed. Carey & Wall.* ii. 83. Rivea pomacea, *Wight Ic.* t. 888. Convolvulus pomaceus, *Wall. Cat.* 1419, *part of second sheet.*

SOUTH DECCAN; Mysore, *Roxburgh*; Coimbatore, *Wight*; Nilgherries, *G. Thomson*, &c.

Large, scandent. *Leaves* 1–3 in., sometimes emarginate, often undulate, base rhomboid or rounded; petiole $\frac{3}{4}$ in. *Peduncles* 0–$\frac{3}{4}$ in.; bracts $\frac{1}{4}$–$\frac{3}{4}$ in. *Corolla* 2 in., tubular-campanulate, hirsute without. *Berry* $\frac{2}{3}$ in. diam., yellow-brown, pulpy.

VAR. *triflora*; leaves narrowly elliptic rhomboid at the base glabrate above sparsely strigose beneath, peduncles $\frac{1}{3}$–$\frac{2}{3}$ in. 1–3-flowered, bracts $\frac{1}{3}$–$\frac{1}{2}$ in. narrowly oblong obtuse glabrous, sepals glabrous. A. Leschenaultii, *Thwaites Enum.* 209, *not of Chois.* Ipomæa n. 43, *Herb. Ind. Or. H. f. & T.*—Ceylon; *Thwaites* (C. P. n. 1932).

14. **A. sericea,** *Dalz. & Gibs. Bomb. Fl.* 169; leaves ovate-cordate acute hispid or strigose above densely silky beneath, peduncles as long as the petioles, flowers capitate, bracts prominent persistent oblong or elliptic nerved silky, sepals elliptic-lanceolate often unequal. Ipomæa bracteata, *Graham Cat. Bomb. Pl.* 131, *not of G. Don.*

MALABAR GHAUTS and CONCAN, frequent; *Stocks, Law*, &c.; Belgaum, *Ritchie.*

A powerful, silky twiner. *Leaves* 3–5 in., base of lower deeply cordate; petiole 1–3 in. *Peduncles* 1–4 in.; bracts attaining 1$\frac{1}{2}$ in. *Sepals* $\frac{1}{3}$ in., two outer often much longer. *Corolla* 2$\frac{1}{2}$ in., tubular-funnel-shaped, pink, hirsute, without. *Berry* $\frac{1}{2}$ in. diam., orange-coloured, pulpy.—Perhaps, as Dalzell suggests, nearest to *A. argentea*, but is usually referred to *A. bracteata*, Choisy, to which it is not very near.

15. **A. Leschenaultii,** *Chois. Convolv. Or.* 31, and in *DC. Prodr.* ix. 329, *not of Thwaites*; innovations white-tomentose, leaves subcordate ovate acuminate softly hairy on both surfaces, peduncles short, bracts linear, sepals $\frac{1}{4}$–$\frac{1}{3}$ in. ovate obtuse. Convolvulus Choisyanus, *Wall. Cat.* 2259, *type sheet only* (*Choisy*).

NILGHERRIES, alt. 1–6000 ft.; *Wight*, &c.

A powerful climber. *Leaves* 6 by 5 in., suddenly shortly acuminate, closely villous subtomentose beneath becoming less so in age; petiole 2 in. *Peduncles* $\frac{1}{2}$–2 in., softly villous; bracts $\frac{3}{4}$ by $\frac{1}{8}$ in., subpersistent. *Corolla* 2 in., hirsute without.

Berry ¾ in. diam., pulpy.—Convolvulus Choisyanus (*Wall. Cat.* 2259) is not now in Wallich's herbarium; Choisy says it is *Argyreia Leschenaultii*; but it may have been *A. Choisyana*, Wight.

16. **A. nellygherya,** *Chois. Convolv. Or.* 82, and in *DC. Prodr.* ix. 329; leaves subcordate elliptic subacute softly hairy above densely villous beneath, peduncles shorter than the leaves, cymes few-fld. subcapitate, bracts oblong persistent, sepals ⅓ in. ovate obtuse. Convolvulus pomaceus, *Wall. Cat.* 1419, *partly.*

NILGHERRIES, alt. 6000 ft.; *Wight*, &c.

Differs little from *A. Leschenaultii* except that the leaves are only half as wide (2–2½ in.) and much more shaggy, often rufescent somewhat shining beneath. It is also very near *A. pomacea*, but has larger sepals and peduncles often 2–3 in.

17. **A. malabarica,** *Chois. Convolv. Or.* 38, and in *DC. Prodr.* ix. 331; stem pubescent, leaves ovate-cordate acute sparsely hispid on both surfaces ultimately nearly glabrous, peduncles 2–5 in., bracts elliptic or oblong, sepals in fruit ⅓–⅔ in. elliptic-lanceolate. *Dalz. & Gibs. Bomb. Fl.* 169. Convolvulus malabaricus, *Linn.*; *Blume Bijd.* 715, *not of Roxb.* C. Rottleri, *Spreng. Syst. cur. post.* 61? Ipomæa malabarica, *Roem. & Sch.* iv. 235.—*Rheede Hort. Mal.* xi. t. 51.

MALABAR and COROMANDEL (*Choisy*).—DISTRIB. Java, Cochin China (*Choisy.*)

Founded on Rheede's plate, no authentic example being seen by any author, with which, however, Wight's Herb. n. 2353 (named *A. Leschenaultii*) very closely agrees. —Wight had a ms. species, *A. courtallensis*, in his Herb., the plant on which Choisy founded his *A. Leschenaultii.* Hence, Wight having the name *A. Leschenaultii* in excess, applied it to his n. 2353; but the three species are so near that they might be made one.

18. **A. hirsuta,** *Arn. Pugill. Pl. Ind. Or.* 38; leaves ovate-cordate acute villous above shaggy beneath, peduncles very long patently hispid, bracts prominent linear or oblong outer often petioled leaflike, sepals ½ in. ovate obtuse. *Chois. in DC. Prodr.* ix. 330; *Bot. Mag.* t. 4946. Rivea hirsuta, *Wight Ic.* t. 891.

NILGHERRY MTS., common; *Wight*, &c.

Probably, as Arnott suggests, a large form of *A. nellygherya*, which the sepals, corolla, and fruit resemble. The peduncles are often 4–8 in., and the outer petioled bract makes the cymes pseudo-sessile. The needle-like hairs on the stems and peduncles also give the plant a different aspect.

VAR. *coacta*; leaves cordate triangular-ovate acute closely shortly silky beneath, peduncles very long, bracts large elliptic-oblong flat sparsely hairy. Rivea zeylanica, var. β hirsuta, *Thwaites Enum.* 209.—Ceylon, alt. 4000 feet, *Thwaites*, &c. This in its indumentum and the more triangular leaves does not agree at all closely with *A. hirsuta*, Arn.

19. **A. pilosa,** *Arn. Pugill. Pl. Ind. Or.* 38; leaves ovate subcordate acute hairy on both surfaces, peduncles shorter than the leaves, flowers capitate, bracts linear persistent, sepals elliptic-lanceolate acute often bristly upwards. *Chois. in DC. Prodr.* ix. 330.—Argyreia, n. 22 and 24, *Herb. Ind. Or. H. f. & T.*

WESTERN DECCAN PENINSULA, the CONCAN, CANARA, and MYSORE; *Law*, *Ritchie*, &c.

A powerful twiner. *Leaves* 2–6 in., base rounded or slightly cordate, fulvous-strigose beneath or sometimes green less hairy; petiole long. *Peduncles* ½–4 in., variable in length, stout; bracts ¾ by ⅛ in., bristly. *Sepals* ⅓–½ in. *Corolla* 2 in., tubular-funnel-shaped, hirsute without. *Berry* ⅓ in. diam.—The specimens of *H. f.*

& T. n. 22 have the leaves densely hairy, almost shaggy, fulvous beneath; while here those of n. 24 are strigose green beneath; both have very acute sepals.

20. **A. Lawii**, *Clarke*; leaves elliptic acute base rhomboid or rounded softly strigose on both surfaces, peduncles elongated, cymes small dense, bracts narrowly oblong, sepals ¼ in. ovate obtuse.—Argyreia n. 28, *Herb. Ind. Or. H. f. & T.*

The CONCAN and MALABAR, Bababoodan Hills, *Law*, &c.

Scandent, subsericeous. *Leaves* 4 by 2 in., whiter beneath; petiole 1-2 in. *Peduncles* 2–5 in., silky, white, slenderer than in the foregoing species; bracts ⅜ by ⅛ in. *Cyme* dichotomous 3–9-fld., with one in the fork; flowers subsessile. *Corolla* 2 in. and upwards, tubular-campanulate, hairy without. *Fruit* not seen.—Appears closely allied to *A. Choisyana*, but the sepals differ widely.

21. **A. Choisyana**, *Wight ms.*; leaves subcordate elliptic-oblong hairy on both surfaces, peduncles 1–3-fld. shorter than the leaves, bracts narrowly oblong, sepals ⅓–½ in. elliptic-lanceolate acuminate. Batatas Choisyana, *Wight Ic.* t. 491.

MADRAS; Balaghaut Hills, *Wight.*

A twiner, patently hirsute. *Leaves* 2 by 1 in., subobtuse, densely strigose above, silky somewhat shining beneath; petiole ⅓–⅔ in. *Peduncles* 1–2 in., hirsute, often with 1 or 2 silky shining subfoliaceous bracts remote from the flowers; proper bracts ¾ by ⅓ in. *Corolla* nearly 2 in., tubular-funnel-shaped, hirsute without. *Ovary* 4-celled. *Fruit* not seen.—Neither the leaves, flowers, ovary or bracts of this species resemble those of *Ipomæa atropurpurea* to which Choisy (in *DC. Prodr.* ix. 366) has reduced it.

VAR.? *Wightii*; leaves rhomboid at the base glabrous above sparsely strigose beneath, sepals strigose margins scarious, corolla 2½ in. and upwards.—Madras; Condaputty and other hills, *Wight.* This may be a new species, but it is only a fragment in flower.

22. **A. Daltoni**, *Clarke*; leaves large elliptic or oblong acute glabrate above fulvous-strigose beneath, peduncles elongate, corymbs lax, bracts narrowly oblong persistent, sepals ½–¾ in. ovate-oblong.

CHOTA NAGPORE; Bundgao in Singhboom, alt. 2000 ft., *Clarke.*

A large climber. *Leaves* attaining 9 by 4 in., base usually unequal cuneate, sometimes rounded, primary nerves very oblique; petiole 1–3 in. *Peduncles* 2–4 in., rigid, fulvous-silky; bracts ¾ in., often narrowly subspathulate. *Corolla* 2 in., shaggy without. *Sepals* fulvous-strigose in fruit, coriaceous, concave, two inner shorter glabrate on the margins. *Berry* ⅔ in. diam., pulpose.—Named after Gen. Dalton, Commissioner of Chota Nagpore.

23. **A. cymosa**, *Sweet Hort. Brit.* ed. 2, 373; grey pruinose-pubescent, leaves ovate-cordate shortly acuminate, peduncles long, corymbs often branched, flowers densely capitate at the ends of the branches, bracts orbicular persistent, sepals ovate obtuse. *Chois. Convolv. Or.* 46, and in *DC. Prodr.* ix. 333; *Wight Ic.* t. 839. Lettsomia cymosa, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 492, and *ed. Carey & Wall.* ii. 82. Convolvulus glomeratus, *Wall. Cat.* 2257.

DECCAN PENINSULA, frequent; *Rottler, Wight,* &c.—DISTRIB. Philippines.

Scandent. *Leaves* 2–4 in. diam.; petiole 1–3 in. *Peduncles* 1–4 in.; corymbs 1–4 in. diam., sometimes reduced to single heads; bracts ½ in. diam. *Sepals* ¼–⅓ in., somewhat enlarged in fruit. *Corolla* 2 in., tubular-funnel-shaped, hairy without. *Stamens* not exserted. *Berry* ⅔ in. diam., pulpose.—This is the *Convolvulus malabaricus* of Heyne in Herb. Rottler; and, as it is frequent in the Peninsula, it is probably *Convolvulus malabaricus,* Linn.. though Linnæus founds his *C. malabaricus* on a plate of Rheede's, which is *A. malabarica*, Chois.

** *Stems suberect.*

24. **A. cuneata,** *Ker in Bot. Reg.* t. 661; leaves short-petioled elliptic or obovate villous beneath, peduncles numerous short few-fld., corolla bright-purple. *Chois. Convolv. Or.* 34, and *in DC. Prodr.* ix. 330; *Dalz. & Gibs. Bomb. Fl.* 169; *Brand. For. Fl.* 344. Lettsomia cuneata, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 491, and *ed. Carey & Wall.* ii. 81. Convolvulus cuneatus, *Willd. Sp. Pl.* i. 873; *Wall. Cat.* 1366. Rivea cuneata, *Wight in Hook. Journ. Bot.* iii. 199; *Chois. in DC. Prodr.* ix. 327; *Wight Ic.* t. 890. Ipomæa atrosanguinea, *Bot. Mag.* t. 2170, *not of Chois.*

DECCAN PENINSULA, common.

Shrubby; 2–5 feet; branches often almost virgate, sometimes somewhat twining. *Leaves* 2–4 in., obtuse mucronate or emarginate, glabrate above; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Peduncles* 0–1$\frac{1}{2}$ in., often 3-flowered; bracts deciduous. *Sepals* $\frac{1}{5}$ in., ovate, subobtuse, *Corolla* 2 in., tubular-funnel-shaped, hairy without. *Ovary* 4-celled; *Fruit* $\frac{2}{3}$ in., ovoid, shining, yellow-brown, nearly dry.

25. **A. fulgens,** *Chois. Convolv. Or.* 33. and in *DC. Prodr.* ix. 329; leaves long-petioled elliptic acute densely silky shining beneath, peduncles numerous short few-fld. *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 3, and *Ic.* t. 1357. Convolvulus fulgens, *Wall. Cat.* 1394.

S. DECCAN PENINSULA; *Heyne*; Courtallum, *Wight.*

Branches straight, silky white. *Leaves* 4 by 1$\frac{3}{4}$ in., acuminate, base rounded or rhomboid, glabrate above; petiole 1–2 in. *Peduncles* 1 in., 3–7-fld.; bracts deciduous. *Sepals* $\frac{1}{5}$ in., elliptic, subobtuse. *Corolla* 2 in. and upwards, tubular-campanulate, glabrous without, or when young strigose near the tip, appears to have been very dark in colour. *Ovary* 4-celled. *Fruit* not seen.—In habit closely allied to *A. cuneata.*

4. LETTSOMIA, *Roxb.*

Scandent more or less hairy shrubs. *Leaves* alternate, undivided, base often rounded or cordate. *Cymes* axillary, peduncled, densely corymbose or capitate, bracteate. *Sepals* orbicular elliptic or oblong, in fruit often somewhat thickened or enlarged. *Corolla* tubular-funnel-shaped; limb plicate, lobes usually shallow. *Stamens* included or exserted; anthers oblong or linear, never twisting. *Ovary* 2-celled, 4-ovuled; disc annular, usually prominent; style filiform, stigmas 2 subsessile globose. *Fruit* indehiscent. *Seeds* 4–1.—Species 32, East Asiatic and Tropical Africa.

SUBGENUS I. **Eulettsomia.** Fruit 4-1-seeded, 1-seeded capsules occurring as the rule of no one species.

* *Corolla less than* 1 *in., limb lobed; anthers distinctly exserted.*

1. **L. aggregata,** *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 488, and *ed. Carey & Wall.* ii. 76; leaves ovate cordate subacute glabrous above white-woolly beneath, peduncles grooved when dry shorter than the leaves, flowers capitate, bracts orbicular closely woolly subpersistent, sepals nearly as long as the bracts ovate white-tomentose. *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 4, and *Ic. t.* 1359; *Kurz For. Fl.* ii. 216. Convolvulus orixensis, *Rottl.*; *Wall. Cat.* 1362. C. imbricatus, *Spreng. Syst.* i. 613. Ipomæa imbricata, *Roth Nov. Sp.* 112. Argyreia aggregata, *Chois. Convolv. Or.* 45, and in *DC. Prodr.* ix. 333; *Dalz. & Gibs. Bomb. Fl.* 169.

DECCAN PENINSULA, frequent; *Wight, Dalzell,* &c.

A scandent shrub; branches closely white-tomentose. *Leaves* 1–4 in., somewhat wrinkled above; petiole 1 in. *Peduncles* 0–2 in.; bracts $\frac{1}{3}$–$\frac{1}{2}$ in. *Corolla* $\frac{2}{3}$ in.,

tubular-campanulate, rose-coloured, hirsute without. *Capsule* $\frac{1}{3}$ in., red, as are the fruiting sepals within.

VAR. *osyrensis*; leaves softly hairy above white-tomentose or somewhat fuscous-villous beneath. Ipomæa osyrensis, *Roth Nov. Sp.* 117. Argyreia osyrensis, *Chois. in DC. Prodr.* ix. 334.—Deccan Peninsula, frequent. Tenasserim, *Helfer.* Ceylon, abundant.—DISTRIB. Ava.

2. **L. mysorensis,** *Clarke*; leaves elliptic cordate mucronate glabrous above white-tomentose beneath, peduncles long grooved when dry, corymbs small, bracts shorter than the sepals deciduous, outer sepals ovate inner much smaller narrow.—Argyreia n. 29, *Herb. Ind. Or. H. f. & T.*

MYSORE; *G. Thomson.*

Scandent; branches closely white-tomentose. *Leaves* 5 by 3 in., subobtuse with a mucro; petiole 3 in. *Peduncles* 3–5 in.; outer bracts $\frac{1}{2}$ in., obovate, white-tomentose, caducous, inner $\frac{1}{4}$ in., oblong; outer sepals $\frac{1}{3}$ in. white-tomentose, inner $\frac{1}{4}$ in. oblong. *Corolla* as of *L. aggregata.* *Anthers* exserted. *Fruit* not seen.—Closely allied to *L. aggregata.*

3. **L. bella,** *Clarke*; leaves ovate-cordate acute glabrous or softly hairy above white-tomentose beneath, peduncles terete shorter than the leaves, flowers capitate, bracts small spathulate or oblong, outer sepals elliptic densely white hirsute.

CHOTA NAGPORE, alt. 2000 ft., frequent; *Clarke.*

Scandent; branches white-woolly. *Leaves* 4 in.; petiole 3 in. *Peduncles* $\frac{1}{2}$–3 in., rarely exceeding the petioles; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. Outer *sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., elliptic-lanceolate, in fruit enlarged, subovate, coriaceous; inner sepals gradually smaller; sepals all densely patently white-hirsute. *Corolla* as of *L. aggregata,* more hirsute. *Anthers* exsert. *Capsule* $\frac{1}{4}$ in., red.—Convolvulus vestitus, *Wall. Cat.* 1411, from the Nepal Terai, appears to be this plant; but, if so, Wallich's flowers which are $1\frac{1}{2}$ in. long, cannot belong to it.

4. **L. bracteosa,** *Clarke*; leaves elliptic acute glabrescent above sparingly fuscous-villous beneath, peduncles short, flowers capitate, bracts $\frac{3}{4}$ in. orbicular tomentose persistent, sepals $\frac{1}{3}$ in. orbicular in fruit.

PEGU; *McLelland,* &c.

Scandent; branches glabrescent. *Leaves* 3 by $1\frac{1}{4}$ in.; petiole 1 in. *Peduncles* $\frac{1}{2}$ in., woolly; heads dense, softly hirsute. *Flowers* not seen. *Capsule* red.—Resembles *Convolvulus multibracteatus,* Wall. Cat. 1408 (= *Argyreia tomentosa,* Chois. in DC. Prodr. ix. 333), from Ava, in which the bracts are ovate shortly acute, the sepals linear-lanceolate.

** *Corolla more than* 1 *in. long, anthers included.*

5. **L. elliptica,** *Wight, note to Ic. t.* 1356; leaves elliptic subacute glabrescent above sparsely strigose beneath, corymbs loose, bracts caducous, sepals $\frac{1}{5}$ in ovate, corolla $1\frac{1}{4}$ in. nearly glabrous without. C. ellipticus, *Spreng. Syst.* i. 613; *Wall. Cat.* 1380. C. laurifolius, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 470, and *ed. Carey & Wall.* ii. 50, 573. Ipomæa elliptica, *Roth Nov. Sp.* 113. I. laurifolia, *Sweet Hort. Brit.* ed. 2. 372. Argyreia elliptica, *Chois. Convolv. Or.* 35, and in *DC. Prodr.* ix. 330 (*excl. syn. Wall. Cat.* 1381, 1417); *Dalz. & Gibs. Bomb. Fl.* 169.

DECCAN PENINSULA, *Wight,* &c. CEYLON; central province, not uncommon.

Scandent; innovations villous, soon glabrous or sparingly grey-pubescent. *Leaves* 4 by 2 in., base rhomboid or rounded; petiole $1\frac{1}{2}$ in. *Peduncles* 2–5 in., or short, or leafy, 0 when the corymbs have an outer bract; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* obtuse, in fruit orbicular, coriaceous, patent. *Corolla* pale purple. *Berry* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., depressed-globose, orange-brown.

6. **L. Thomsoni,** *Clarke*; leaves ovate-lanceolate cordate sparsely strigose on both surfaces, peduncles scattered mostly as long as the petioles, flowers capitate, bracts $\frac{1}{3}$–$\frac{1}{2}$ in. spathulate-oblong sparsely villous caducous, sepals $\frac{1}{2}$–$\frac{3}{4}$ in. ovate acute densely patently hirsute. Argyreia capitata, *Brand. For. Fl.* 343, *not of Chois.*

SUBTROPICAL HIMALAYA, alt. 0–4000 ft., from Gurwhal to Sikkim, common; *Royle, Thomson, J. D. H.*, &c.

Scandent; stems sparsely villous. *Leaves* 5 by $2\frac{1}{4}$ in., acuminate; petiole 2 in. *Peduncles* 2–5 in.; bracts shorter than, and much less hirsute than the sepals, sometimes subpersistent. *Sepals* with soft fulvous hairs $\frac{1}{8}$–$\frac{1}{6}$ in. long, in fruit coriaceous slightly enlarged. *Corolla* nearly 2 in., rose-purple, hirsute without. *Capsule* usually 4–2-seeded.

7. **L. hirsutissima,** *Clarke*; leaves ovate-cordate acute softly dusky villous on both surfaces, peduncles short collected towards the ends of the branches, flowers capitate, bracts $\frac{1}{3}$ in. oblong villous deciduous, sepals $\frac{1}{2}$–$\frac{3}{4}$ in. elliptic acute densely patently hirsute. Convolvulus hirsutissimus, *Wall. Cat.* 1400. Argyreia capitata β conferta, *Chois. in DC. Prodr.* ix. 332.

SIKKIM HIMALAYA, alt. 5000 ft.; Tendong, *Clarke.*—DISTRIB. Ava.

Perhaps only a villous mountain form of *L. Thomsoni*. *Leaves* villous or almost silky. *Peduncles* $\frac{1}{2}$–2 in., rigid, forming as it were a narrow terminal dense panicle.

8. **L. strigosa,** *Roxb. Hort. Beng.* 13, and *Fl. Ind. ed. Carey & Wall.* ii. 80; leaves cordate suborbicular suddenly short acuminate sparsely hispid on both surfaces, peduncles long, flowers capitate, bracts 1 in. elliptic-oblong sparsely hispid persistent, sepals unequal smaller than the bracts densely bristle-hispid. L. capitata, *Miq. Fl. Ind. Bat.* ii. 591. Convolvulus strigosus, *Wall. Cat.* 1365, *type sheet.* C. capitatus, *Vahl Symb.* iii. 28. C. capitiformis, *Poir. Enc. Suppl.* iii. 469. Ipomæa capitata, *Roem. & Sch. Syst.* iv. 238, *not of Chois.* Argyreia capitata, *Chois. Convolv. Or.* 41, and in *DC. Prodr.* ix. 332, *in part.*

BENGAL PLAIN, and ASSAM, common; extending into subtropical valleys of the adjacent mountains.—DISTRIB. Java.

A powerful climber; branches hispid. *Leaves* 5 by $4\frac{1}{4}$ in., usually very obtuse, covered with needle-like fulvous long straight patent hairs, as is nearly the whole plant; petiole 2 in. *Peduncles* 2–4 in.; bracts much less copiously bristly than the sepals. *Sepals* $\frac{1}{2}$–$\frac{3}{4}$ in.; outermost elliptic, inner almost linear, coriaceous in fruit. *Corolla* 2 in. purple, hispid without. *Capsule* $\frac{1}{4}$ in., papery, usually 4–2-seeded.

9. **L. peguensis,** *Clarke*; leaves ovate-lanceolate cordate densely softly hairy on both surfaces, peduncles long, flowers capitate, bracts 1 in. elliptic-oblong softly densely hairy subpersistent, sepals unequal smaller than the bracts densely hispid. Argyreia capitata, *Kurz For. Fl.* ii. 216; *Choisy in DC. Prodr.* ix. 332, *chiefly.* Convolvulus strigosus, *Wall. Cat.* 1365, *partly.*

BRITISH BURMA, common; *Griffith, Parish*, &c. TAVOY; *Wallich.* ANDAMANS, *Helfer*, &c.

Perhaps only a marked local variety of *L. strigosa*, as Choisy and Kurz have esteemed it; is very constant in its characters and general aspect. *Stem* villous or woolly, without the needle-like hairs of *L. strigosa*. *Leaves* gradually narrowed upwards. *Corolla* softly sparsely hairy without.

10. **L. barbigera,** *Clarke*; leaves ovate-lanceolate cordate sparsely hirsute on both surfaces, peduncles long, flowers capitate, bracts $\frac{1}{3}$–$\frac{1}{2}$ in. ovate obtuse persistent, sepals ovate and elliptic longer than the bracts densely subpatently hirsute. Convolvulus barbiger, *Wall. Cat.* 1404. Pharbitis barbigera,

G. Don. Gen. Syst. iv. 262. Argyreia barbigera, *Chois. Convolv. Or.* 42, and in *DC. Prodr.* ix. 332; *Brand. For. Fl.* 343.

ASSAM; *Jenkins.* BRITISH BURMA; Prome, *Wallich.*

Probably a var. of *L. setosa*; it differs in the capitate inflorescence and spreading almost hispid backs of the sepals.

11. **L. setosa,** *Roxb. Hort. Beng.* 13, and in *Fl. Ind.* i. 490, and *ed. Carey & Wall.* ii. 80; leaves ovate-cordate acute or subobtuse sparsely hirsute on both surfaces, peduncles long, corymbs dense, bracts $\frac{1}{3}$–$\frac{1}{2}$ in. ovate obtuse adpressedly strigose persistent, sepals ovate or elliptic longer than the bracts densely adpressedly strigose. *Wight Ic.* t. 1360. Convolvulus setosus, *Wall. Cat.* 1412. C. strigosus, *Spreng. Syst.* i. 600. Ipomæa strigosa, *Roth Nov. Sp.* 113. Argyreia setosa, *Chois. Convolv. Or.* 43, and in *DC. Prodr.* ix. 332; *Dalz. & Gibs. Bomb. Fl.* 168; *Brand. For. Fl.* 343.

Throughout tropical and subtropical INDIA, from Oudh, Mt. Aboo and Bombay, to Pegu. CEYLON.

A large climber; branches adpressedly strigose. *Leaves* 3–5 in., in age sometimes nearly glabrous; petiole 1–3 in. *Peduncles* 2–8 in., stout, adpressedly strigose; bracts coriaceous, very obtuse, at length deciduous; corymbs 1–4 in. diam., dense, but not capitate, branches thick. *Sepals* ovate, inner elliptic, very coriaceous, somewhat enlarged in fruit. *Corolla* 1$\frac{1}{2}$–2 in., densely setose without, rose-coloured. *Stamens* included. *Berry* much more succulent than in *L. strigosa*, ovoid, subacute, red, usually 4–2-seeded.

VAR. *minor*; leaves 1–2 in., peduncles 1 in., flowers capitate.—Argyreia n. 21, *Herb. Ind. Or. H. f. & T.*—Deccan Peninsula, *Wight*; S. Concan and Bababoodan Hills, *Law.*

VAR. *obovata*; leaves large 6 by 5 in. obovate obtuse or emarginate, fruit of *L. setosa.* Convolvulus obovatus, *Wall. Cat.* 1381.—Nepal; *Wallich.*—Reduced to *L. elliptica* by Choisy (*DC. Prodr.* ix. 330, under Argyreia), from which it is certain that the true *Convolvulus obovatus*, now in the Wallichian herbarium, was not detected by Choisy among Wallich's collections, which were placed loose in his hands. Several species not found by Choisy appear to have been afterwards identified correctly by Kippist, the Librarian of the Linnæan Society, in arranging the herbarium.

12. **L. atropurpurea,** *Clarke*; leaves elliptic-lanceolate cordate sparsely hirsute on both surfaces, heads dense subsessile, bracts large oblong-lanceolate persistent. Convolvulus atropurpureus, *Wall. Cat.* 1345, and *Fl. Ind. ed. Carey & Wall.* ii. 54, and *Pl. As. Rar.* i. 38, t. 43. Ipomæa atropurpurea, *Chois. Convolv. Or.* 75, and in *DC. Prodr.* ix. 366 (syn. partly excl.). I. sphærocephala, *Don. Prodr.* 98, *syn. excl.*

NEPAL; *Wallich.* SIKKIM TERAI; *J. D. H.*, &c.

A large climber. *Leaves* 6 by 2$\frac{1}{2}$ in., base deeply cordate; petiole 1$\frac{1}{2}$ in. *Peduncles* 0–$\frac{1}{2}$ in., fulvous-hirsute; bracts 1$\frac{1}{2}$ in., acuminate, softly hirsute. *Sepals* $\frac{3}{4}$ in., oblong-lanceolate, herbaceous, softly hairy, lax in fruit. *Corolla* 1$\frac{1}{2}$ in., tubular-campanulate, hirsute without, dark-purple, or in a Sikkim example, white. *Fruit* $\frac{1}{3}$ in. diam., globose, coriaceous, indehiscent, usually 4–2-seeded.

13. **L. sikkimensis,** *Clarke*; leaves large elliptic shortly acuminate at both ends or subobtuse sparsely hairy beneath, peduncles long, corymbs small few-fld., bracts linear-oblong, sepals $\frac{1}{4}$ in. round nearly glabrous.—Argyreia n. 12, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Pomong, alt. 3000 ft., *Clarke.* KHASIA MTS., SILHET and CACHAR, *H. f. & T.*, *Keenan.*

A large twiner; stems closely strigose. *Leaves* 5$\frac{1}{2}$ by 3 in., base usually shortly cuneate, sometimes rounded; petiole 2–5 in. *Peduncles* 3–8 in., somewhat slender; bracts $\frac{1}{2}$–1 in., inconspicuous, deciduous, or one of the outer sometimes leaflike

petioled. *Calyx* very small for the flower. *Corolla* 2½–3 in., widely tubular-funnel-shaped, nearly glabrous without, purple. *Stamens* included; anthers not twisted. *Ovary* 2-celled; stigmas 2, sessile, globose.—*Fruit* not seen, hence this may be an *Ipomœa*; but the large long-petioled leaves and large wide-tubed corollas indicate rather *Lettsomia*. This resembles *L. elliptica, Wight*, which has smaller flowers, more numerous in the corymbs.

14. **L. rubens,** *Clarke*; leaves ovate-cordate shortly acuminate sparingly hairy beneath, peduncles long 1–5-fld., bracts caducous, sepals widely elliptic obtuse sparsely softly hairy. Convolvulus rubens, *Wall. Cat.* 1421. Ipomæa rubens, *Chois. Convolv. Or.* 81, and in *DC. Prodr.* ix. 371, var. *a.*

ASSAM; Goalpara, *Wallich.* BENGAL; Silhet, *Wallich, H. f. & T.*; Cachar, *Keenan.*

Scandent; stems sparsely softly hairy. *Leaves* 4 by 3 in., somewhat deeply cordate; petiole 2–3 in. *Peduncles* 2–4½ in.; bracts deciduous before the flowers expand; pedicels ½–¾ in. *Sepals* ¼–⅓ in. *Corolla* 1½–2 in., widely tubular-funnel-shaped, softly silky without on the plaits, at least when young, rose-purple. *Ovary* 2-celled; stigmas 2, sessile, globose. *Fruit* not seen.—From the habit and few-flowered peduncles, this has been supposed a *Rivea*; but the ovary is 2-celled. The var. *lanata*, Choisy, is founded on *Convolvulus glandulosus*, Ham. in Wall. Cat. 2252, collected in Lower Assam. This plant is not now in Wallich's herbarium, but from the description it may have been *Argyreia Roxburghii*, Choisy.

15. **L. barbata,** *Clarke*; leaves oblong acuminate or elongate-lanceolate shining fulvous-silky beneath, heads few-fld. subsessile, bracts 1 in. filiform persistent. Convolvulus barbatus, *Wall. Cat.* 1391, and *Pl. As. Rar.* ii. 45, t. 155. Ipomæa barbata, *Chois. Convolv. Or.* 76, and in *DC. Prodr.* ix. 366, *not of Roth.*

PEGU; *Wallich.* TENASSERIM; *Helfer*; Mergui, *Griffith.*

Scandent, stems with bright long fulvous hairs; innovations densely silky. *Leaves* in Wallich's type oblong or subelliptic acute (in numerous other examples very narrow, 7½ by 1½ in.), sparsely or densely fulvous-hairy beneath, sparingly hairy above; petiole ½–¾ in. *Peduncle* 0–½ in.; bracts numerous, scarcely $\frac{1}{12}$ in. broad, fulvous-hirsute. *Sepals* ⅓ in., elliptic-lanceolate, in fruit ovate. *Corolla* 1¼ in., widely tubular-campanulate, pale rose-coloured, glabrous without. *Berry* ⅓ in. diam.; depressed-globose, reddish, usually 4–2-seeded.

SUBGENUS 2. **Moorcroftia.** *Fruit* 1- rarely 2-seeded.

16. **L. rubicunda,** *Clarke*; leaves large elliptic shortly acute fuscous-villous beneath, peduncles long, bracts deciduous, corymbs compound open, sepals round obtuse fuscous-woolly. Convolvulus rubicundus, *Wall. Cat.* 1409. Argyreia rubicunda, *Chois. Convolv. Or.* 44, and in *DC. Prodr.* ix. 333.—Argyreia n. 26, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith, Maingay.*—DISTRIB. Ava.

A powerful climber; stems fulvous-villous. *Leaves* 6½ by 4 in., base rounded, in age glabrate above, thick; petiole 1–2 in. *Peduncles* 3–7 in., fulvous-lanate; corymbs 2–6 in. diam., many-fld.; bracts caducous before the flowers expand. *Sepals* ⅕ in., in fruit ⅓ in., inner somewhat smaller. *Corolla* ¾ in., densely fulvous-hirsute without. *Fruit* ¾ by ⅓–½ in., ellipsoid, obtuse, smooth, nearly dry, lower half closely embraced by the calyx.

17. **L. Maingayi,** *Clarke*; leaves large elliptic acute glabrescent, heads large subsessile, bracts large ovate-lanceolate persistent, sepals linear-lanceolate.

MALAY PENINSULA, *Griffith*; Malacca, *Maingay.*

A large climber; branches stout, sparsely patently hairy. *Leaves* 6½ by 3½ in.,

base rhomboid or rounded, adult glabrous or with scattered fulvous hairs on the nerves beneath, coriaceous; petiole ½–1 in. *Peduncles* 0–½ in., fulvous-hirsute; heads 2–3 in. diam., very dense; bracts nearly 2 by 1 in., sparsely hairy. *Sepals* 1 in. and upwards; flower-buds densely hairy without. *Berry* ¾ by ½ in., ellipsoid, very succulent, 1-seeded. Expanded flowers not seen.

18. **L. hancorniæfolia,** *Clarke*; leaves elliptic acuminate glabrous, peduncles short 1-fld., sepals ovate subobtuse ashy pubescent. Argyreia hancorniæfolia, *Gardn.*; *Thwaites Enum.* 210.

CEYLON; ascending to 5000 ft., *Walker*, &c.

Scandent; branches ashy-pubescent, afterwards glabrate. *Leaves* 3 by ½ in., base rounded; nerves at right angles to the midrib, very fine and close; petiole 1½ in. *Peduncles* ¼–¾ in., ashy-pubescent; bracts near the middle, ⅔ in., linear, caducous. *Sepals* ¼ in. *Corolla* 1⅔ in., tubular-funnel-shaped, glabrous without, purple. *Ovary* 2-celled; stigmas 2, globose. *Berry* 1 by ⅔ in., ellipsoid, very succulent, 1-seeded.

19. **L. adpressa,** *Miq. Fl. Ind. Bat.* ii. 591; leaves elliptic acute hairy on both surfaces, peduncles very short, cymes small, bracts small lanceolate hairy. Convolvulus adpressus, *Wall. Cat.* 1424. Moorcroftia adpressa, *Chois. Convolv. Or.* 49, and in *DC. Prodr.* ix. 334.

PENANG; *Wallich, Maingay*, &c.

Shrubby (? scandent); branches hairy. *Leaves* 4½ by 2 in., base obtuse or cuneate; petiole 1½ in. *Peduncles* ½–1½ in., hirsute; bracts ⅓ by ⅛ in., a leaflike bract sometimes added; pedicels 0–⅛ in. *Sepals* ⅓–½ in., narrowly lanceolate, sparsely hirsute. *Corolla* 1¼ in., hirsute without. *Berry* ½ in., ellipsoid.

20. **L. penangiana,** *Miq. Fl. Ind. Bat.* ii. 592; leaves elliptic-oblong adult glabrous or midrib beneath sparsely hairy, peduncles elongate slender glabrate, cymes lax, bracts inconspicuous. Convolvulus penangianus, *Wall. Cat.* 1425. Moorcroftia penangiana, *Chois. Convolv. Or.* 50, t. 4, and in *DC. Prodr.* ix. 335.

PENANG; *Wallich.*

Scandent; innovations thinly fulvous-hirsute. *Leaves* 6 by 2½ in., base obtuse or cuneate, coriaceous; petiole ½–¾ in. *Peduncles* 2–4 in.; pedicels (many of them) ¼–½ in. *Sepals* ⅕ in., ovate, obtuse, sparsely hirsute. *Corolla* (only seen in Choisy's picture) 1¾ in., tubular-funnel-shaped, hirsute without. *Berry* ⅔ by ⅓ in., ovoid.—Nearly allied to *L. adpressa*, but only one specimen seen.

21. **L. ? Kurzii,** *Clarke*; leaves ovate subcordate very sparingly hairy beneath, peduncles long, cymes few-flowered, bracts ½ in. linear, sepals ⅓ in. linear-oblong, capsule berry-like yellow size of a pea usually 1-seeded. Argyreia zeylanica, *Kurz For. Fl.* ii. 215, *syn. excl.*

PEGU, not rare in the upper forests (*Kurz*).

An extensive twiner; young shoots sparingly adpressed-hairy. *Leaves* 3–5 in., sometimes a foot long and broad. *Peduncle* 5–8 in. *Corolla* large, funnel-bell-shaped, pink; tube 1¼ in., lobes of the limb triangular blunt.—Not seen; the foregoing copied from Kurz, who supposed this plant to be *Ipomæa zeylanica*, Gaertn., which does not grow in Burma; nor will Kurz's description of the fruit suit, which, if correctly described as a 1-seeded berry no bigger than a pea; it may possibly be a *Porana*.

5. IPOMÆA, *Linn.*

Herbs, rarely shrubs, twining or prostrate, less often suberect. *Leaves* alternate, entire, lobed or divided. *Cymes* axillary, 1- many-fld.; bracts various. *Flowers* purple, white or yellow, usually showy. *Sepals* ovate or linear, equal or unequal, in fruit erect or rarely patent. *Corolla* campanulate

or funnel-shaped, tube long or short; limb 5-plaited, margin very shortly lobed. *Stamens* unequal, included or exserted; filaments filiform or dilated at base, often hairy, not with processes subconnivent over the ovary; anthers oblong, ultimately twisted or straight. *Ovary* 2-celled, 4-ovuled, rarely 4-celled and 4-ovuled (subgenus *Quamoclit*), or 3-celled and 6-ovuled (subgenus *Pharbitis*); disc annular; style filiform, stigma entire or 2-globose. *Capsule* globose or ovoid, 4–3- (rarely sub- 2-) valved. *Seeds* as many as the ovules, or fewer.—Species 300, in the warmer regions of both hemispheres.

SUBGENUS I. **Calonyction,** *Chois. in DC. Prodr.* ix. 345 (genus). *Corolla-tube* elongate, 2–6 in., many-times longer than the sepals. *Stamens* about as long as the corolla-tube. *Ovary* 2-celled.

1. **I. bona-nox,** *Linn. Sp. Pl.* 228, *as to the American plant only, not of Gaertn.*; stem smooth or muricate, leaves cordate ovate acute glabrous entire or angular or lobed, peduncles long 1–5-flowered, flowering sepals ovate mucronate or shortly acute rarely obtuse, corolla white tube linear, capsule 1 in. ovoid-oblong, seeds glabrous. *Cav. Ic.* iii. 52, t. 300; *Bot. Mag.* t. 752; *Jacq. Hort. Schoenb.* i. 13, t. 36; *Benth. in Hook. Fl. Nigrit.* 465; *Meissn. in Mart. Brasil.* vii. 215. Calonyction speciosum, *Chois. Convolv. Or.* 59, t. 1, fig. 4, and in *DC. Prodr.* ix. 345, *as to the American plant and synonyms only.*

Cultivated throughout INDIA, native of tropical America.

VAR. *grandiflora*; leaves cordate ovate acute not lobed. I. grandiflora, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 497, and *ed. Carey & Wall.* ii. 87. I. noctiluca, *Herb. in Bot. Reg. note to* t. 917. I. bona-nox, *Blume Bijd.* 712; *Kurz For. Fl.* ii. 217, *not of Linn. even in part.* I. aculeata, *Blume Bijd.* 715, *fide Hassk.* I. Roxburghii, *Steud. Nomencl. not of Sweet.* I. noctiflora, *Griff. Notul.* iv. 286. Convolvulus grandiflorus, *Wall. Cat.* 1370. Quamoclit longiflora, *G. Don Gen. Syst.* iv. 259. Calonyction speciosum, *Chois. Convolv. Or.* 59, and in *DC. Prodr.* ix. 345, var. α and β (*but most of the Indian synonyms quoted belong to* C. asperum, *Chois.*); *Wight Ic.* t. 1361; *Dalz. & Gibs. Bomb. Fl.* 164; *Hassk. Pl. Jav. Rar.* 522. C. Roxburghii, *G. Don Gen. Syst.* iv. 263, *wholly or in part.*

TROPICAL INDIA, in most climates common; from Assam and Bengal to Tenasserim, and Malabar.—DISTRIB. E. Asia, Tropical Africa.

Extensively scandent; stems smooth, or not rarely muricate. *Leaves* 3–8 in., glabrate, secondary nervation much less prominent than in *I. glaberrima*; petiole 3–6 in. *Peduncles* 2–6 in.; bracts caducous. *Sepals* ½ in., usually ovate, obtuse, mucronate, in fruit unaltered or slightly enlarged. *Corolla-tube* 3 by ⅕ in., limb 3–5 in. diam., pure white or with plaits greenish, never with at all purple. *Anthers* shortly exserted or subincluded. *Capsule* narrowed upwards; peduncle at length somewhat thickened.—Moon-flower of the English; the flower expands at night, closes to wither about one hour after sunrise; see Sir W. Jones in *Asiat. Research.* iv. 257. It does not appear that Linnæus ever saw *I. grandiflora*, Roxb., which is perhaps specifically distinguishable from the American *I. bona-nox*; there are many specimens of the typical *I. bona-nox* supplied from Asia; but American seeds of this were grown in India in Roxburgh's day, if not before. It is consequently now very difficult to decide whether *I. bona-nox* and *I. grandiflora* should be regarded as distinct.

2. **I. muricata,** *Jacq. Hort. Schoenb.* iii. 40, t. 323, *not of Cav.*; stem usually muricate, leaves cordate-ovate acute glabrous entire, peduncles 1–5-fld. somewhat shorter than the petioles, flowering sepals elliptic-lanceolate, corolla rose-purple tube linear, capsule ½–⅔ in. globose apiculate, seeds glabrous. *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 499, and *ed. Carey & Wall.* ii. 89; *Benth. in Hook. Fl. Nigrit.* 465; *Miq. Fl. Ind. Bat.* ii. 608. I. bona-nox, β purpurascens, *Bot. Reg.* iv. t. 290. Convolvulus muricatus, *Linn. Mant.* 44; *Wall. Cat.*

2249. Calonyction muricatum, *G. Don Gen. Syst.* iv. 264. C. bona-nox, *var.* muricata, *Chois. in DC. Prodr.* ix. 345, *partly, not of Baker.*

HIMALAYA, alt. 1–5000 ft., frequent from Kangra to Sikkim. DECCAN HILLS, *Rottler, Wight,* &c., cultivated elsewhere.—DISTRIB. Japan.

A much weaker plant than *I. bona-nox*; leaves 2–4 in.; sepals in flower more lanceolate, in fruit nearly as of *I. bona-nox*; corolla-tube 1–2 by $\frac{1}{5}$ in., hairy within; peduncle usually greatly thickened under the fruit.—Clearly distinct from *I. bona-nox.*

3. **I. grandiflora,** *Lamk. Ill.* i. 467; stem usually muricate, leaves cordate-ovate acute entire glabrous, peduncles 1–3-flowered short, flowering sepals large elliptic, corolla white tube linear, capsule nearly 1 in. diam. globose, seeds softly shortly villous margins shaggy. I. longiflora, *Br. Prodr.* 484; *Benth. Fl. Austral.* iv. 418. I. macrantha, *Roem. & Sch. Syst.* iv. 251. I. glaberrima, *Bojer*; *Hook. Journ. Bot.* i. 357. I. Tuba, *G. Don Gen. Syst.* iv. 270; *Meissn. in Mart. Brasil.* vii. 216. I. jucunda, *Thwaites Enum.* 211, 426. Convolvulus grandiflorus, *Linn. f. Suppl.* 136, *not of Wall.* C. asper, *Wall. Cat.* 1388. C. Tuba, *Schlecht. in Linnæa,* 1831, 735. Calonyction asperum *and* grandiflorum, *Chois. Convolv. Or.* 60, and in *DC. Prodr.* ix. 346, *some syn. excl.* C. comorensis, *Bojer Hort. Maurit.* 228. C. comospermum, *Bojer. Hort. Maurit.* 228; *Chois. in DC. Prodr.* ix. 346. C. muticum, *Dcne. in Nouv. Ann. Mus.* iii. 390; *Chois. in DC. Prodr.* ix. 345. C. pseudomuricatum, *G. Don Gen. Syst.* iv. 264. C. longiflorum, *Hassk. Pl. Jav. Rar.* 523.—*Rheede Hort. Mal.* xi. t. 50.

W. DECCAN PENINSULA; common. CEYLON; Dolosbage district, rare, *Thwaites.* DISTRIB. Timor, New Caledonia, Australia, and Polynesia, Mascarene Islands with E. Tropical Africa. Tropical America, cultivated.

A large twiner; stem often softly muricate. *Leaves* 3–6 in. diam., often deeply cordate, secondary nerves prominent; petiole 2–5 in. *Peduncles* usually 1–2 in.; flowers 1–3; bracts caducous. *Sepals* in flower $\frac{3}{4}$–1 in., obtuse or very shortly acute; in fruit enlarged, orbicular, often $1\frac{1}{2}$ in. diam., embracing the capsule. *Corolla-tube* $2\frac{1}{2}$ by $\frac{1}{4}$ in., sometimes much longer, limb 3 in. diam. *Capsule* obtuse; peduncles in fruit somewhat thickened.—The length of the peduncle is very variable, almost 0, in others, as in the *Convolvulus asper* and in Thwaites's *Calonyction comospermum,* more than 4 in. Brown describes his *I. longiflora* as with obtuse sepals, and Bentham's *I. longiflora* is identical with the Ceylon *I. grandiflora*; but F. Mueller has lately supplied specimens with much-acuminated sepals, which prove either that the sepals in *I. grandiflora* are eminently variable or that there is another species of *Calonyction* in Australia.

4. **I. trichosperma,** *Blume Bijd.* 710; stem often muricate, leaves ovate-cordate acute glabrous sometimes lobed, peduncles very short 1-fld., flowering sepals large elliptic, corolla very large tube much wider than in *I. grandiflora,* capsule nearly 1 in. diam. subglobose, seeds softly villous margins shaggy. I. Yomæ, *Kurz For. Fl.* ii. 218. Calonyction trichospermum, *Chois. Convolv. Or.* 60, and in *DC. Prodr.* ix. 346. C. diversifolium, *Hassk. Pl. Jav. Rar.* 523, *not of Fl. des Serres,* t. 1328.

SILHET; *H. f. & T.,* &c. PEGU; *Kurz.* MOULMEIN; *Parish.*—DISTRIB. Java.

Very near *I. grandiflora,* but some of the leaves are lobed, and the flower is very large; in Parish's example more than 6 in. long, with the tube 1 in. diam.—The Khasian examples are in fruit, and have the leaves very slightly lobed; some Javan specimens have subdigitate leaves.

SUBGENUS II. **Quamoclit,** *Chois. in DC. Prodr.* ix. 335 (genus). *Corolla* crimson (in cultivated varieties orange yellow or white), middle-sized, tube narrow long, mouth rather small. *Anthers* exsert. *Ovary* 4-celled, 4-ovuled. *Capsule* 4-celled.

5. **I. coccinea,** *Linn.*; *Bot. Mag.* t. 221; leaves ovate-cordate acute glabrous, sepals elliptic suddenly acuminate, seeds densely furred. *Roxb. Hort. Beng.* 14; *Andr. Bot. Rep.* t. 499; *Meissn. in Mart. Brasil.* viii. 217, *with syn.* I. luteola, *Jacq. Ic. Rar.* i. t. 35; *Blume Bijd.* 711. I. phœnicea, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 502, and *ed. Carey & Wall.* ii. 92. Convolvulus coccineus *and* luteolus, *Spreng. Syst.* i. 599. C. phœniceus, *Spreng. Syst.* i. 596; *Wall. Cat.* 1372. Quamoclit coccinea, *Moench Hort. Marb.* 453; *Chois. in DC. Prodr.* ix. 335, *with syn.* Q. phœnicea, *Chois. Convolv. Or.* 51, t. 1, fig. 1, and in *DC. Prodr.* ix. 336.

Cultivated and quasi-wild throughout INDIA, erroneously supposed by Roxburgh to be a native of Coromandel.—Introduced from tropical America.

Stems subscandent, weak. *Leaves* 2–4 in. diam., entire or lobed; petiole 2–4 in. *Peduncles* 2–6 in., slender; cyme lax, few or many-flowered; bracts inconspicuous. *Sepals* ¼ in., unaltered in fruit. *Corolla* crimson, in garden varieties orange or yellow; tube 1 in., mouth ¾ in. diam. *Ovary* completely 4-celled. *Capsule* ¼ in. or rather more, ovoid, smooth, completely 4-celled; dissepiments thin, membranous, persistent.

6. **I. Quamoclit,** *Linn.*; *Bot. Mag.* t. 244; leaves pinnate segments numerous linear, sepals elliptic, seeds nearly glabrous. *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 502, and *ed. Carey & Wall.* ii. 93; *Blume Bijd.* 708; *Meissn. in Mart. Brasil.* vii. 217, *with syn.* Convolvulus pennatus, *Lamk. Enc.* iii. 567. C. Quamoclit, *Spreng. Syst.* i. 591; *Wall. Cat.* 1375. Quamoclit vulgaris, *Chois. Convolv. Or.* 52, and in *DC. Prodr.* ix. 336.—*Rumph. Herb. Amb.* v. t. 155, fig. 2.; *Rheede Hort. Mal.* xi. t. 60.

Common throughout INDIA, in gardens and as a denizen; native of tropical America.

A slender, glabrous twiner. *Leaves* 3–5 by 2–3 in., segments distant. *Peduncles* few-flowered. *Corolla* crimson or white. *Flowers* and capsules nearly as of *I. coccinea.*

SUBGENUS III. **Pharbitis,** *Chois. in. DC. Prodr.* ix. 341 (genus). *Corolla-tube* narrow. *Anthers* included. *Ovary* 3-celled, 6-ovuled. *Capsule* 3-celled, 6–4-seeded.

7. **I. hederacea,** *Jacq. Collect.* i. 124, and *Ic. Rar.* i. t. 36; hairy, leaves ovate-cordate 3-lobed lobes ovate acuminate, peduncles 1–5-fld. mostly shorter than the petioles, sepals elliptic elongate-linear patently hirsute near the base, seeds glabrous. *Bot. Reg.* t. 85; *Blume Bijd.* 710; *Meissn. in Mart. Brasil.* vii. 228. I. cœrulea, *Koen.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 501; *ed. Carey & Wall.* ii. 91; *Bot. Reg.* t. 276. I. punctata, *Pers. Syn.* i. 184. I. nil *and* barbata, *Roth Cat. Bot.* i. 36, 37. I. Dillenii, *Roem. & Sch. Syst.* iv. 227. Convolvulus nil, *Linn.*; *Bot. Mag.* t. 188. C. hederaceus, *Linn.*; *Wall. Cat.* 1373. C. Dillenii, *Lamk. Enc.* iii. 544. C. cœruleus, *Spreng. Syst.* i. 593. Convolvuloides triloba, *Moench Hort. Marb.* 452. Pharbitis hederacea *and* nil, *Chois. Convolv. Or.* 57, 58, and in *DC. Prodr.* ix. 343, 344. P. diversifolia, *Lindl. in Bot. Reg.* t. 1988. P. variifolia, *Dcne. in Nouv. Ann. Mus.* iii. 390. P. Purshii, punctata *and* barbata, *G. Don Gen. Syst.* iv. 263, *with many other syn.*

INDIA; both cultivated and apparently wild, common.—DISTRIB. Tropical and subtropical regions of both hemispheres.

Stem twining, sparsely retrorsely hirsute. *Leaves* 2–5 in. diam.; petiole 1–4 in. *Peduncles* rarely longer than the petioles; pedicels usually ¼ in.; bracts 2, ⅓ in., linear, close to the calyx. *Sepals* ½–1 in., subequal, narrowly linear upwards, very hirsute, or nearly glabrous near the base. *Corolla* 1¼–2 in., tubular-funnel-shaped, rose-coloured, blue, or somewhat orange below. *Anthers* never twisted. *Capsule*

$\frac{1}{4}$ in., ovoid, subglobose, smooth.—Probably an American plant, naturalised in the Old World. *I. scabra*, Forsk., is adduced as a syn. by Choisy (DC. Prodr. ix. 344), which, if this is correct, is the oldest name; but Forskahl says his plant had 5-lobed leaves, hence the name of Linnæus and Meissner has been here retained.

VAR. *integrifolia*, Chois.; leaves ovate-cordate acute entire, peduncles about as long as the petioles, sepals elliptic much elongate. I cœrulescens, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 500, and *ed. Carey & Wall.* ii. 90.—Cultivated and apparently wild. Intermediate states connect this with *I. hederacea.* It is often called *I. hispida*, but it differs from that in the elongate ligulate termination to the sepals.

VAR. *himalaica*; leaves and flowers larger, sepals in fruit attaining $1\frac{1}{2}$ in., seeds densely closely villous.—Himalaya, alt. 4–5000 ft., from Kashmir to Sikkim, in the inner valleys at some distance from the plains.

8. **I. purpurea,** *Lamk. Ill.* i. 466; hairy, leaves ovate-cordate acute entire, peduncles few-fld., sepals elliptic-oblong acute patently hirsute near the base, seeds glabrous. *Meissn. in Mart. Brasil.* vii. 223. Convolvulus purpureus, *Linn.*; *Bot. Mag.* tt. 113, 1005, 1682.

INDIA; ascending to 3–7000 ft. in Kashmir, Sikkim, the Khasia Mts. and W. Deccan Peninsula, probably not a native.—DISTRIB. Tropical America; extensively cultivated in all warm countries.

Resembles the entire-leaved var. of *I. hederacea*; but the leaves are smaller; peduncles often longer and slenderer; pedicels 1 in., umbelled, deflexed in fruit; sepals $\frac{1}{3}$–$\frac{1}{2}$ in., unequal, without the ligulate termination characteristic of *I. hederacea.* Inhabits very remote parts of the mountains, and has about as good a claim to be regarded as Indian as has *I. hederacea.*

9. **I. laciniata,** *Clarke*; glabrous, leaves 5–7-partite segments serrate or pinnatifid, peduncles 1–3-fld. shorter than the leaves, corolla-tube long linear. Pharbitis laciniata, *Dalz. in Hook. Kew Journ.* iii. 178; *Dalz. & Gibs. Bomb. Fl.* 167.—Ipomæa n. 40, *Herb. Ind. Or. H. f. & T.*

WEST DECCAN PENINSULA; Bababoodan Hills, *Law*; Bombay and Malwar, *Dalzell*; Belgaum, *Ritchie.*

Stem slender, creeping or twining. *Leaves* 1–2 in. diam., subdigitate, lobes elliptic or almost linear; petiole $\frac{1}{2}$–1 in. *Peduncles* mostly 1-fld., thickened upwards in fruit; bracts $\frac{1}{5}$ in., linear. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., elliptic, somewhat wider in fruit. *Corolla* white, tube 2 by $\frac{1}{8}$ in., purple within, limb $1\frac{1}{2}$–2 in. diam. *Anthers* scarcely exserted. *Ovary* 3-celled. *Capsule* $\frac{1}{3}$ in., ovoid, subglobose, glabrous. *Seeds* closely, densely furred.

10. **I. dissecta,** *Willd. Phyt.* 5, t. 2, fig. 3; glabrous, leaves digitate, lobes linear-cuneate toothed or pinnatifid, peduncles sub- 1-flowered shorter than the leaves, corolla very small. *Benth. Fl. Austral.* iv. 416; *Chois. in DC. Prodr.* ix. 363, *partly.* I. coptica, *Roth Nov. Sp.* 110; *Chois. Convolv. Or.* 89, and in *DC. Prodr.* ix. 384; *Dalz. & Gibs. Bomb. Fl.* 166. Convolvulus copticus, *Linn. Mant.* 559; *Roxb. Fl. Ind.* i. 477, and *ed. Carey & Wall.* ii. 62; *Wall. Cat.* 1351. C. stipulatus, *Lamk. Enc.* iii. 546. C. Thonningii, *Schum. Pl. Guin.* 98.

W. INDIA and the DECCAN, not common, *Heyne, Shuter, Wight.* CEYLON; north of the Island, *Gardner.*—DISTRIB. Tropical Africa and Australia.

Stems 1–3 ft., prostrate, hardly twining. *Leaves* 1–$1\frac{1}{2}$ in. diam.; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{1}{2}$-$1\frac{1}{2}$ in.: bracts near the flower, minute; or flowers subsessile amongst the digitate leaflike bracts. *Sepals* $\frac{1}{5}$ in., oblong; in fruit widened, rigid, back often muricate. *Corolla* $\frac{2}{3}$ in., tubular-funnel-shaped, white. *Capsule* $\frac{1}{4}$ in. diam., glabrous, 6-valved, normally 6-seeded. *Seeds* glabrous or very nearly so.

SUBGENUS IV. **Aniseia,** *Chois. in DC. Prodr.* ix. 429 (genus). Two outer sepals (at least in fruit) much longer than the inner, cordate or sub-

hastate. *Stamens* included. *Ovary* 2-celled, 4-seeded.—Not well distinguishable from *Euipomœa*, in which the outer sepals are usually somewhat larger.

11. **I. uniflora,** *Roem. & Sch. Syst.* iv. 247, *not of Blume*; glabrescent, leaves petioled oblong obtuse, peduncles 1-flowered, sepals ultimately enlarged decurrent, corolla 1 in. campanulate. I. lanceolata, *G. Don Gen. Syst.* iv. 282. Convolvulus uniflorus, *Lamk. Enc.* iii. 544; *Burm. Fl. Ind.* 47, t. 21, fig. 2. C. emarginatus, *Vahl Symb.* iii. 23. C. Rheedii, *Wall. Cat.* 1358, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 70; *Wight in Hook. Bot. Miscell.* ii. 106, t. 8. Aniseia uniflora, *Chois. Convolv. Or.* 101, t. 2, fig. 9, and in *DC. Prodr.* ix. 431; *Wight Ic.* t. 850; *Dalz. & Gibs. Bomb. Fl.* 163.—*Rheede Hort. Mal.* xi. t. 54.

Throughout INDIA, from Nepal, *Wallich*, and Khasia, *J. D. H.*, to CEYLON, (*Thwaites*) and Malacca (*Griffith*, *Maingay*); not common, more frequent in the Deccan Peninsula.—DISTRIB. Malaya to Fiji Islands; Tropical Africa.

Creeping in wet places, twining. *Leaves* 3 by 1 in., often emarginate with a mucro, base cuneate; petiole ¾ in. *Peduncles* 1½ in.; bracts minute, persistent. *Sepals* in flower ⅓–½ in., outer elliptic, acute; in fruit ¾–1 in., 2 outer subcordate ovate scarious nervose, inner lanceolate. *Corolla* hairy without. *Capsule* ½ in., ovoid, glabrous. *Seeds* glabrous, margins minutely strigose.

12. **I. calycina,** *Benth. in Gen. Pl.* ii. 872; leaves ovate-cordate acute entire, peduncles short few-fld., sepals ultimately cordate or sagittate, corolla scarcely 1 in. tubular. I. sagittata, *Roxb. Ic. ined. not of Desf.* I. cariosepala, *Klotz. in Nub. Pl.* Convolvulus calycinus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 471, and *ed. Carey & Wall.* ii. 51; *Wall. Cat.* 2255. C. Hardwickii, *Spreng. Syst. curae post.* 60. Aniseia calycina, *Chois. Convolv. Or.* 100, and in *DC. Prodr.* ix. 429; *Wight Ill.* t. 168 *b*, fig. 5, and *Ic.* t. 833; *Dalz. & Gibs. Bomb. Fl.* 163.

DECCAN PENINSULA; frequent; extending to Banda (*Edgeworth*) and the W. Himalaya (*Royle*).—DISTRIB. Tropical Africa.

Stems much twining, villous. *Leaves* 2–3 in., deeply cordate, sparsely hairy or glabrate; petiole 1½ in. *Peduncles* ⅔ in.; pedicels ¾ in.; bracts ¼ in., linear. *Sepals* in flower ¼ in., unequal, ciliate; outer in fruit ½ by ¼ in., lanceolate, hastate. *Corolla* rose or white; mouth funnel-shaped, narrow. *Capsule* ¼ in., ovoid, glabrous. *Seeds* villous, margins with long silky hairs.

13. **I. barlerioides,** *Benth. in Gen. Pl.* ii. 872; hirsute, leaves ovate-oblong scarcely acute, peduncles longer or shorter than the petioles 1-fld., corolla 2–3½ in. funnel-shaped. Convolvulus barlerioides, *Wall. Cat.* 2256. C. oblongus, *Wall. Cat.* 1382. Aniseia barlerioides, *Chois. Convolv. Or.* 102, and in *DC. Prodr.* ix. 432.

N. W. INDIA, *Royle*; Subsiwaliks, *Edgeworth*; KUMAON, alt. 4000 feet, *Strachey & Winterbottom*. OUDH; *R. Thompson*. CHOTA NAGPORE; *Clarke*. W. DECCAN PENINSULA southward to Courtallam; *Wight*, *Dalzell*, *Ritchie*, &c.

Twining. *Leaves* 2–3 in., base obtuse or subcordate; petiole 0–1¼, very variable on the same stem. *Peduncles* 1–4 in.; longer than the petioles in the N. Indian plant (Choisy's type), hardly any in other S. Indian examples; bracts ¼ in., linear. *Sepals* in flower ¾ in., lanceolate; in fruit much widened, 2 outer ovate. *Corolla* purple or purplish-white, glabrous or sparsely hairy without; tube very narrow at the base; mouth 2½ in. diam. *Capsule* ½ in., ovoid, glabrous. *Seeds* oblong, villous or pubescent, margins sometimes hirsute.

SUBGENUS V. **Batatas,** *Chois. in DC. Prodr.* ix. 337 (genus). *Corolla* widely tubular-funnel-shaped. *Stamens* included. *Ovary* 4-celled, 4-ovuled.

14. **I. digitata,** *Linn.*; *Meissn. in Mart. Brasil.* vii. 278, *with all syn.*; glabrous, leaves large palmately 5–7-lobed, peduncles many-fld. longer than the petioles, sepals elliptic shortly acute glabrous, seeds woolly with hairs $\frac{1}{4}$ in. long. *Chois. in DC. Prodr.* ix. 389, *char. emend.* I. paniculata, *Br. Prodr.* 486; *Blume Bijd.* 709; *Bot. Reg.* t. 62, *not of Burm.* I. mauritiana, *Jacq. Hort. Schoenb.* ii. 39, t. 200. I. gossypifolia, *Willd. Enum. Hort. Berol.* 208. I. eriosperma, *Beauv. Fl. Owar et Ben.* ii. 73, t. 105. I. insignis, *Andr. Bot. Rep.* t. 635; *Bot. Reg.* t. 75; *Bot. Mag.* t. 1790. I. tuberosa, *G. F. W. Mey. Esseq.* 102. I. platensis, *Bot. Reg.* t. 333; *Bot. Mag.* t. 3685; *Chois. in DC. Prodr.* ix. 387. Convolvulus paniculatus, *Linn. Sp. Pl.* 223; *Roxb. Fl. Ind.* i. 478, and *ed. Carey & Wall.* ii. 63; *Wall. Cat.* 1350. C. digitatus, platensis, and insignis, *Spreng. Syst.* i. 591, 592. C. roseus, *Kunth. in Humb. & Bonpl.* iii. 108, *not of Mill.* Batatas paniculata, *Chois. Convolv. Or.* 54, t. 1, fig. 2, and *in DC. Prodr.* ix. 339; *Wight in Madras Journ.* v. 4, t. 11; *Dalz. & Gibs. Bomb. Fl.* 167. B. edulis, *Chois. in DC. Prodr.* ix. 339, *var.* γ *only.*

TROPICAL INDIA; common, from Bengal and Assam to Ceylon; not in the drier western portion.—DISTRIB. Tropical Asia, Africa, America and Australia, in moist climates.

A large, scandent perennial. *Leaves* 3–7 in. diam., often lobed nearly to the base; lobes lanceolate or elliptic, often spathulate; petiole 2–5 in. *Peduncles* often 6 in.; bracts deciduous; flowers not capitate. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., wider concave in fruit. *Corolla* $1\frac{1}{2}$–$2\frac{1}{2}$ in., widely campanulate, glabrous, pink-purple. *Anthers* never twisted. *Ovary* completely 4-celled, unless perhaps near the top. *Capsule* $\frac{1}{2}$ in., ovoid, completely 4-celled to the apex, 4-valved, the long wool from the seeds exsert from the fissures.

15. **I. pentaphylla,** *Jacq. Ic. Rar.* t. 319, *not of Cav.*; thinly hirsute, leaves digitate, leaflets broad-lanceolate subsessile, peduncles long laxly dichotomous, sepals large elliptic outer patently hirsute, seeds glabrous. *Meissn. in Mart. Brasil.* vii. 287, *with all syn.* I. pilosa, *Cav. Ic.* iv. 11, t. 323, *not of Sweet.* Convolvulus pentaphyllus, *Linn. Sp. Pl.* 223. C. hirsutus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 479, and *ed. Carey & Wall.* ii. 65. C. munitus, *Wall. Cat.* 1354; *Wight in Hook. Bot. Miscell.* ii. 104, t. 7. C. nemorosus, *Roem. & Sch. Syst.* iv. 303. Batatas pentaphylla, *Chois. Convolv. Or.* 54, and in *DC. Prodr.* ix. 339; *Wight Ic.* t. 834; *Dalz. & Gibs. Bomb. Fl.* 167. Spiranthera pentaphylla, *Bojer Hort. Maurit.* 226.

W. INDIA; Hindoostan, Gujerat, W. Deccan Peninsula, frequent.—DISTRIB. Africa, Polynesia, Tropical America; often cultivated.

A twining annual. *Leaflets* 2–4 in.; petiole 2 in. *Peduncles* 1–4 in.; bracts $\frac{1}{3}$ in., linear; pedicels $\frac{1}{2}$–2 in., fulvous-hirsute. *Sepals* $\frac{1}{2}$ in., obtuse or subacute; in fruit enlarged, sometimes nearly 1 in. *Corolla* $1\frac{1}{4}$ in., wide-funnel-shaped, glabrous, white or ochroleucous. *Ovary* completely 4-celled. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., ovoid, papery, completely 4-celled; endocarp separating, with a hole opposite the back of each seed.

16. **I. Batatas,** *Lamk. Enc.* vi. 14; glabrous or sparingly hairy, leaves ovate-cordate acute angular or more or less lobed, peduncles long many fld., sepals elliptic shortly acute glabrous, seeds glabrous. *Meissn. in Mart. Brasil.* vii. 282. I. Catesbæi, *G. F. W. Mey. Esseq.* 103. Convolvulus Batatas, *Linn.*; *Roxb. Fl. Ind.* i. 483, and *ed. Carey & Wall.* ii. 69; *Blume Bijd.* 712; *Wall. Cat.* 1356. C. indicus, *Moris. Hist.* ii. *sect.* 1, t. 3, fig. 4. C. edulis, *Thunb. Fl. Jap.* 84. C. esculentus, *Salisb. Prod.* 123. Batatas edulis, *Chois. Convolv. Or.* 53, and in *DC. Prodr.* ix. 338. B. xanthorhiza, *Bojer Hort. Maurit.* 225.—*Rumph. Herb. Amb.* v. t. 130. *Rheede Hort. Mal.* vii. t. 50.

Cultivated in INDIA, but not extensively.—Native of America.

Tubers red, white or rarely yellow. *Stem* usually hairy. *Flowers* 2 in. and

upwards, purple. *Ovary* 4-celled. *Capsule* 4-celled, or by suppression 3–1-celled.—The *Sweet Potato*; though that term is given to yams in Bengal. Said to fruit rarely.

SUBGENUS 6. **Euipomæa.** *Sepals* subequal, or the outer somewhat larger, especially in fruit. *Corolla* funnel-shaped or campanulate, glabrous without or very nearly so. *Stamens* included. *Ovary* 2-celled, 4-ovuled, rarely imperfectly 4-celled near the base. *Capsule* 2-celled, 4–2-seeded, rarely 1-celled and 1-seeded.—This subgenus is designed to include all the species of *Ipomœa* not distinctly referable to any one of the 5 preceding subgenera.

* *Flowers capitate; bracts persistent.*

17. **I. pileata,** *Roxb. Fl. Ind.* i. 504, and *ed. Carey & Wall.* ii. 94; sparsely hairy, leaves ovate-cordate acute entire, heads many-fld. enclosed by a large boat-shaped bract, corolla tubular-funnel-shaped pink. *Chois. Convolv. Or.* 74, and in *DC. Prodr.* ix. 365; *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 5, and *Ic.* t. 1363; *Dalz. & Gibs. Bomb. Fl.* 166. Convolvulus pileatus, *Spreng. Syst. curae post.* 61; *Wall. Cat.* 1376.

ASSAM, BENGAL to TENASSERIM; ascending to 4000 feet. DECCAN PENINSULA and CEYLON; frequent.

Stems annual, twining, patently hairy. *Leaves* 2–3 in. diam., deeply cordate, mostly long-petioled. *Peduncles* 1–4 in.; outer bracts 1–2½ in., entire, produced or almost auriculate at each end; inner ovate or subspathulate. *Sepals* elliptic, acute, inner narrower, very hairy. *Corolla-tube* ¾ by $\frac{1}{10}$ in., linear-cylindric; mouth 1¼ in., suddenly widened. *Capsule* ¼ in., subglobose, papery. *Seeds* smooth.—Easily known by its boat-shaped outer bract. *I. involucrata*, Beauv. Fl. Owar. et Ben. ii. 52, t. 89, of W. Africa has a similar bract, and Choisy (in *DC. Prodr.* ix. 365) doubts if this can be kept distinct. It differs, however, *inter alia*, by the corolla-tube ¼ in. wide.

18. **I. Wightii,** *Chois. Convolv. Or.* 88, and in *DC. Prodr.* ix. 364; leaves ovate-cordate acute entire angular or sublobate softly villous above white-woolly beneath, heads long-peduncled, outer bracts lanceolate acuminate, corolla middle-sized pink-purple, capsule minutely pubescent. *Wight Ic.* t. 1364. Convolvulus Wightii, *Wall. Pl. As. Rar.* ii. 55, t. 171; *Wall. Cat.* 1406. C. gossypinus, *Wall. Cat.* 1407.

MTS. of the DECCAN PENINSULA; Nilgherries, Pulneys, Bababoodan Hills, *Wight*, &c. CEYLON; Central Provinces, alt. 2–3000 ft.

Stems twining, fulvous-villous. *Leaves* 3–4 in. diam., sinuate-denticulate, rarely obscurely 3-lobed; petiole 2 in. *Peduncles* 2–5 in.; heads 1–2 in. diam., dense, fulvous-hirsute; outer bracts 1 in., inner shorter linear. *Sepals* ½–¾ in., linear-lanceolate, subequal, fulvous-hirsute, scarcely altered in fruit. *Corolla* 1¼ in., sparsely hairy without. *Capsule* ¼ in. diam., subglobose, papery. *Seeds* puberulous.—*I. pilosa* has the leaves similarly whitened beneath, but the flowers are not capitate, and the capsule not pubescent.

19. **I. bracteata,** *Wight Ic.* t. 1374; hairy, leaves ovate-cordate acute entire, heads peduncled, outer bracts ovate-cordate, corolla small narrow-campanulate purple-pink.

S. DECCAN PENINSULA; Quilon, *Wight*.

Stems weak, twining, patently hairy. *Leaves* 1–2 in. diam., softly thinly hairy on both surfaces; petiole 1½ in. *Peduncles* ½–2½ in.; outer bracts ¾ in., deeply cordate; inner smaller, ovate or elliptic, obtuse. *Sepals* ⅓ in., spathulate-oblong, inner smaller, linear-lanceolate. *Corolla* ⅔ in., nearly glabrous without. *Capsule* not seen—The sepals are much more unequal (even at flower-time) than in Wight's picture; it might be placed in subgenus *Aniseia*. When dry it greatly resembles *Hewittia bicolor*.

VAR. *lobata*; leaves 3–7-lobed sometimes nearly to the base, lobes narrowed near their bases, capsule $\frac{1}{5}$ in. diam. papery glabrous, seeds ellipsoid minutely adpressedly fulvous-silky with braid-like markings.—S. Deccan Peninsula; *Wight, Stocks, Law.* Wight has named this *I. hepaticifolia,* Burm., from which it recedes in the distinctly-cordate ovate bracts.

20. **I. pes-tigridis,** *Linn.*; *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 93; hairy, leaves deeply 5–9-lobed, heads peduncled, outer bracts ovate or elliptic oblong not cordate, corolla medium-sized funnel-shaped pink. *Blume Bijd.* 709; *Wight Ic.* t. 836; *Chois. Convolv. Or.* 73, and in *DC. Prodr.* ix. 363; *Dalz. & Gibs. Bomb. Fl.* 165. Convolvulus pes-tigridis, *Spreng. Syst.* i. 592; *Wall. Cat.* 1374. C. bryoniæfolius, *Salisb. Prod.* 125. Convolvuloides palmata, *Moench. Meth.* 452.—*Rheede Hort. Mal.* xi. t. 59.

Throughout INDIA from the Punjab to Malacca and Ceylon, frequent in the drier low hills.—DISTRIB. Malaya, China, Polynesia, Tropical Africa.

Stems twining, patently hirsute. *Leaves* 1–5 in. diam., hirsute on both surfaces; lobes elliptic, acuminate, narrowed at the base; petiole 1–2 in. *Peduncles* $\frac{1}{2}$–3 in.; heads dense, fulvous-hirsute, outer bracts 1 in., inner smaller narrower acute. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., lanceolate, acute, hirsute, hardly enlarged in fruit. *Corolla* $1\frac{1}{4}$ in., tube narrow, mouth suddenly widened, sparsely hairy without. *Capsule* $\frac{1}{4}$ in., ovoid, papery, glabrous. *Seeds* minutely velvety or nearly glabrous.

VAR. *hepaticifolia*; leaves 3-lobed or angular. I. hepaticifolia, *Linn. Sp. Pl.* 230; *Burm. Fl. Ind.* 50, t. 20, fig. 2; *Chois. Convolv. Or.* 74, and in *DC. Prodr.* ix. 363. Convolvulus hepaticifolius, *Spreng. Syst.* i. 594.—S. Deccan Peninsula and Ceylon; frequent.

VAR. *capitellata*; leaves ovate-cordate acute entire. I. capitellata, *Chois. Convolv. Or.* 75, and in *DC. Prodr.* ix. 363. I. tamnifolia, *Burm. Fl. Ind.* 50, *partly (as to the Indian plant) not of Linn.* Convolvulus capitellatus, *Wall. Cat.* 2250.—Throughout the Deccan extending north to Behar and Hindoostan; not rare.—A complete series connects the *I. pes-tigridis* with its 3-lobate-leaved form, and another connects it with the entire-leaved form. The entire-leaved form has been supposed to be Wight's *I. bracteata*; while on the other hand Wight supposed his *I. bracteata* with lobed leaves to be *I. hepaticifolia.* The two species are easily separable, *I. bracteata* having bracts obtuse outer distinctly cordate: *I. pes-tigridis* bracts acute outer not at all cordate.

21. **I. eriocarpa,** *Br. Prodr.* 484; hairy, leaves oblong-cordate acute, heads sessile, bracts ovate-linear, corolla small campanulate pink, capsule patently hairy. *Chois. in DC. Prodr.* ix. 369; *Benth. Fl. Austral.* iv. 426. I. sessiliflora, *Roth Nov. Sp.* 116; *Wight Ic.* t. 169; *Chois. Convolv. Or.* 76, and in *DC. Prodr.* ix. 366; *Dalz. & Gibs. Bomb. Fl.* 166. I. hispida, *Roem. & Sch. Syst.* iv. 238. I. ligulata, *Bojer Hort. Maurit.* 229. I. sphærocephala, *Sweet Hort. Brit.* ed. 2, 372. I. Horsfieldiana, *Miq. Fl. Ind. Bat.* ii. 611. Convolvulus eriocarpus and sessiliflorus, *Spreng. Syst.* i. 598, 599. C. sphærocephalus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 472, and *ed. Carey & Wall.* ii. 53; *Wall. Cat.* 1344. C. hispidus, *Vahl Symb.* 329. C. Rampania, *Wall. Cat.* 225 (not now in Wallich's Herbarium).

Throughout INDIA, alt. 0–4000 ft.; common. CEYLON; ascending to 4000 ft.——DISTRIB. Affghanistan and Tropics of the Old World.

Stems twining, patently villous. *Leaves* $2\frac{1}{2}$ by 1 in., sparsely hairy on both surfaces; petiole 1 in. *Peduncles* 0, or (in one Hindoostan example of Thomson's) $\frac{1}{2}$–$2\frac{1}{2}$ in.; heads sometimes few-fld., rarely reduced to one subsessile flower; bracts $\frac{1}{4}$ in., hirsute; sepals similar to the bracts but smaller, unaltered in fruit. *Corolla* $\frac{1}{3}$ in. *Capsule* $\frac{1}{4}$ in., globose. *Seeds* puberulous.

22. **I. Stocksii,** *Clarke*; hairy, leaves elliptic subacute, heads sessile, bracts lanceolate inconspicuous, corolla small, capsule glabrous.

DECCAN PENINSULA; *Stocks.*

Stems prostrate, twining, patently hairy. *Leaves* 2 in., rhomboid, base obtuse or subcordate; petiole ½-1½ in. *Bracts* ½ in., hispid. *Sepals* ⅓-½ in., elliptic-lanceolate, patently hispidulous. *Capsule* ¼-⅓ in., ovoid, 2-celled, 4-seeded. *Seeds* furred, margins villous.—Near *I. eriocarpa.*

** *Flowers pedicelled, cymose, subracemose or solitary.*

† *Leaves undivided or angular or somewhat lobed, rarely deeply.*

23. **I. angustifolia,** *Jacq. Ic. Rar.* t. 317, *not of Chois.*; glabrous, leaves sessile hastate-oblong or -linear acute, peduncles long 1–3-fld., sepals ovate acuminate, corolla small yellow. *Benth. Fl. Austral.* iv. 425. I. denticulata, *Br. Prodr.* 485; *Bot. Reg.* t. 317, *not of Chois.* I. filicaulis, *Blume Bijd.* 721; *Chois. Convolv. Or.* 66, and in *DC. Prodr.* ix. 353; *Dalz. & Gibs. Bomb. Fl.* 165; *Bot. Mag.* t. 5426. Convolvulus hastatus and angustifolius, *Lamk. Enc.* iii. 542, 547. C. filicaulis, *Vahl Symb.* iii. 24. C. simplex, *Pers. Syn.* i. 178. C. denticulatus, *Spreng. Syst.* i. 603. C. linifolius, *Wall. Cat.* 1389. C. medium, *Roxb. Fl. Ind.* i. 474, and *ed. Carey & Wall.* 256; *Wall. Cat.* 1346, *not of Linn.* C. Blumii, *Dietr. Syn. Pl.* i. 675.—*Rheede Hort. Mal.* xi. t. 55.

Hills of the DECCAN PENINSULA and CEYLON; extending north to Bundelcund, *Edgeworth.* KHASIA MTS., alt. 0–3000 ft.; common, and thence to Malacca.—DISTRIB. S. E. Asia, Malaya, Australia, Tropical Africa.

Diffuse, biennial, twining. *Leaves* 1½–3 in., more or less toothed. *Peduncles* often longer than the leaves; bracts minute, persistent; pedicels long. *Sepals* ¼-⅓ in. *Corolla* ¾ in., funnel-shaped, eye purple. *Capsule* ¼ in., ovoid, papery, glabrous, 2-celled. *Seeds* glabrous.

24. **I. tridentata,** *Roth, Cat. Bot.* ii. 19; glabrous, leaves sessile hastate-oblong or subquadrate obtuse truncate or 3-toothed, peduncles often as long as the leaves 1–3-fld., sepals ovate acuminate, corolla small yellow. *Chois. Convolv. Or.* 65, and in *DC. Prodr.* ix. 353; *Dalz. & Gibs. Bomb. Fl.* 165. Evolvulus tridentatus, *Linn. Sp. Pl.* 392; *Burm. Fl. Ind.* 77, t. 16, fig. 3. Convolvulus tridentatus, *Linn. Sp. Pl.* 157; *Roxb. Fl. Ind.* i. 475, and *ed. Carey & Wall.* ii. 56; *Wall. Cat.* 1347.—*Rheede Hort. Mal.* xi. t. 65.

DECCAN PENINSULA and CEYLON; frequent; extending north to Chota Nagpore.—DISTRIB. Ava, Banca.

Rootstock woody, giving off numerous, closely-prostrate, elongate stems. *Leaves* usually less than 1 in., sometimes subemarginate, mucronate. *Flowers*, capsules and seeds, nearly as of *I. angustifolia*, with which Thwaites (*Enum.* 211) unites it; but it is a smaller plant with smaller flowers, never twining.

25. **I. linifolia,** *Blume Bijd.* 721; sparsely hairy or glabrate, leaves petioled narrowly oblong lower often subcordate ovate-oblong, peduncles few or many-fld., sepals elliptic obtuse glabrous, corolla small yellow, capsule 1-celled 4-seeded. *Chois. in DC. Prodr.* ix. 369; *Benth. Fl. Austral.* iv. 423. I. setulosa, *Zoll. Verz. by Moritz.* 51. Convolvulus cæspitosus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 483, and *ed. Carey & Wall.* ii. 70; *Wall. Cat.* 1357. C. Benthamii, *Wall. Cat.* 1393. Hewittia cæspitosa, *Steud. Nom. Bot.* Skinneria cæspitosa, *Chois. Convolv. Or.* 105, t. 6, and in *DC. Prodr.* ix. 435.

SUBTROPICAL SIKKIM, *J. D. H.*, &c. ASSAM and SILHET, frequent; *Wallich, Masters,* &c., and thence to MALACCA.—DISTRIB. Malay Archipelago, Australia.

Annual or biennial. *Stems* slender, much twining (creeping, *Roxburgh*). *Leaves* 1½–2½ in., oblong, narrowed suddenly at both ends; lower often subcordate, sometimes ovate; petiole ¼–½ in. *Peduncles* 1–3 in., slender; bracts minute, persistent.

Sepals ⅛ in.; margins, when dry, inflexed above, but hardly acute. *Corolla* ¾ in., subcampanulate, glabrous without. *Ovary* 2-celled. *Capsule* ¼ in., ovoid, papery, with hardly any trace of the dissepiment near its base. *Seeds* glabrous.

26. **I. chryseides,** *Ker in Bot. Reg.* t. 270; leaves ovate-cordate acute glabrous entire toothed or 3-lobed, peduncles many-fld., sepals elliptic glabrous, corolla small yellow. *Wight Ic.* t. 157; *Dcne. in Nouv. Ann. Mus.* iii. 393; *Chois. Convolv. Or.* 87, and in *DC. Prodr.* ix. 382; *Dalz. & Gibs. Bomb. Fl.* 166. I. dentata, *Willd.*; *Roem. & Sch. Syst.* iv. 789. I. subtriflora, *Zoll. Verz. by Moritz*, 51. Convolvulus chryseides, *Spreng. Syst.* i. 598. C. dentatus, *Vahl Symb.* iii. 25; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 62; *Wall. Cat.* 1349. Lepistemon muricatum, *Spanoghe in Linnæa* 1841, 339.

Throughout INDIA, alt. 0–4000 ft. and CEYLON, frequent—DISTRIB. Malaya, S. China, Australia, Tropical Africa.

Stems much twining, glabrous, often muriculate, sometimes in places hairy. *Leaves* 1–2 in.; petiole ½–2 in. *Peduncles* ½–3 in.; bracts small, caducous; cymes dense. *Sepals* ⅕ in., ultimately spreading. *Corolla* ½–¾ in., funnel-shaped, glabrous without, uniform yellow. *Capsule* ¼ in. and upwards, ovoid, somewhat angular, top acute or depressed, 2-celled; wall thicker than in the preceding species. *Seeds* puberulous.

27. **I. polyantha,** *Miq. Fl. Ind. Bat.* ii. 613; sparingly pubescent, leaves ovate-cordate acute entire, cymes peduncled laxly dichotomous many-flowered, sepals broad-elliptic obtuse nearly glabrous, corolla smallish yellow. Convolvulus polyanthus, *Wall. Cat.* 1378.

E. BENGAL; Soorma bank, *J. D. H.*; Soonderbund; *Clarke.*—DISTRIB. Java.

Stems twining, pubescent in places. *Leaves* 2–3 in., deeply cordate, pubescent on the nerves beneath or nearly glabrous; petiole 1–2 in. *Peduncles* 1–4 in.; bracts small, caducous; cymes 2–5 in. diam., minutely pubescent. *Sepals* ¼ in. *Corolla* ¾–1 in., subcampanulate, clear yellow or ochroleucous.

VAR. *affinis*; less diffuse, more pubescent, cymes 3–7-fld., sepals pubescent or almost villous. Convolvulus affinis, *Wall. Cat.* 1385.—Assam, E. Bengal, Soonderbund; *Wallich, H.f. & T.*, &c., frequent. Distrib. Burma.—Referred by Choisy (in *DC. Prodr.* ix. 380) to *I. gemella*, Roth., with which it can have no near affinity; it is very near *I. chryseides*, but has a larger wider corolla, and much longer pedicels.

28. **I. reniformis,** *Chois. Convolv. Or.* 64, and in *DC. Prodr.* ix. 351, *syn. Linn. excl.*; glabrous or sparingly pubescent, leaves small reniform or ovate-cordate toothed, peduncles 0 or very short few-fld., sepals ovate obtuse glabrescent ciliate, corolla small yellow. *Dalz. & Gibs. Bomb. Fl.* 164. I. cymbalaria, *Fenzl in Flora* 1844, 312. Convolvulus reniformis, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 481, and *ed. Carey & Wall.* ii. 67; *Wall. Cat.* 1398. Evolvulus emarginatus, *Burm. Fl. Ind.* 77, t. 30, fig. 1; *Linn. ms. in Herb. Prop.*

DECCAN PENINSULA and CEYLON, alt. 0–3000 ft., common; extending northwards to Rajputana and Behar.—DISTRIB. S. E. Asia, Tropical Africa.

Closely creeping, much branched, often rooting from nearly every node. *Leaves* ¼–1½ in., often small, broader than long, obtuse, sometimes ovate, occasionally 3-lobed; petiole ¼–¾ in. *Peduncles* usually subobsolete, 1–3-flowered; bracts inconspicuous. *Sepals* ⅙ in., glabrescent on the back, ciliate, even in fruit. *Corolla* ½–¾ in., campanulate. *Capsule* ⅕ in., subglobose, 2-celled; cells often 1-seeded. *Seeds* glabrous, dark chestnut-coloured.—Choisy says this species was *Convolvulus gangeticus*, Linn. Amœn. Acad. iv. 306 (*Evolvulus*, Linn. Sp. Pl. 391), to which species Linnæus assigns "leaves and flowers very hirsute, peduncles capillary."

29. **I. rumicifolia,** *Chois. Convolv. Or.* 65, and in *DC. Prodr.* ix. 351; stems sparsely hirsute, leaves ovate-oblong cordate or subhastate sinuate irregularly angular or sublobate, peduncles short laxly few-fld., sepals elliptic-lanceolate patently hirsute, corolla very small. Convolvulus lasiospermus, *Vis. Pl. Ægypt. Nub.* 13, t. 1, fig. 2. C. hirtus, *Wall. Cat.* 2254.

MTS. of the S. DECCAN; Travancore and Nilgherries, *Rottler, Wight,* &c.—DISTRIB. E. Tropical Africa.

Stems annual, twining. *Leaves* 1–2 in., scabrous or sparsely hirsute; petiole 1½ in. *Peduncles* 0–½ in.; bracts ⅕ in., linear, subpersistent; pedicels ¼–⅓ in. *Sepals* ¼ in., acute, widened in fruit. *Corolla* ⅓–½ in., campanulate, white when dry, *Visiani*, probably yellow when fresh. *Capsule* ¼ in. and upwards, ovoid, glabrous, usually 4-seeded. *Seeds* velvety.

30. **I. obscura,** *Ker in Bot. Reg.* t. 239; leaves ovate-cordate acute entire nearly glabrous, peduncles long laxly 1–3-fld., sepals ovate subacute nearly glabrous, corolla middle-sized ochroleucous with a purple base, seeds velvety. *Chois. Convolv. Or.* 82, and in *DC. Prodr.* ix. 370, *some syn. excl.*; *Wight in Madras Journ.* v. 6, t. 12; *Dalz. & Gibs. Bomb. Fl.* 166. I. insuavis, *Blume Bijd.* 716. I. ocularis, *Bartl. in Linnæa,* 1840; *Suppl.* 126. I. ochroleuca, *Spanoghe in Linnæa,* 1841, 340. Convolvulus obscurus, *Linn.*; *Burm. Fl. Ind.* 44; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 52, *not of Hassk.*

Throughout INDIA and CEYLON, alt. 0–3000 ft.; common.—DISTRIB. Malaya, Mascarene Islands, E. Africa.

Stems twining, hairy or nearly glabrous. *Leaves* 1–2½ in.; petiole 1–2 in. *Peduncles* 1–3 in., often 1-flowered, rarely with so many as 3-flowers; bracts ⅛ in., lanceolate, subpersistent; pedicels ½–1½ in. *Sepals* ⅕ in.; ultimately broader, obtuse, reflexed. *Corolla* ¾–1 in., tube narrow, mouth wide, glabrous, yellow or white with the plaits yellowish, always with the purple spot at the base. *Anthers* never twisted. *Capsule* ¼–⅓ in., ovoid, subacute, glabrous, 2-valved, 2-seeded, normally 4-seeded. *Seeds* densely softly brown-velvety; therefore the Indian species is not the *I. obscura* elaborately described by Hasskarl (*Pl. Jav. Rar.* 519).

VAR. *gemella*; adult leaves closely hairy on both surfaces. Convolvulus gemellus, *Wall. Cat.* 1383 *type sheet, not of Vahl.*—BENGAL; *Wallich,* &c., frequent.—Ipomœa gemella, *Chois. Convolv. Or.* 87, and in *DC. Prodr.* ix. 380, consists of Convolvulus gemellus, *Burm. Fl. Ind.* 46, t. 21, fig. 1 (a Javan plant) and the totally different *C. affinis*, Wall., from E. Bengal and Burma; so far as any Malabar examples are supposed to be *I. gemella*, they are perhaps *I. obscura*.

31. **I. Stocksii,** *Clarke*; leaves ovate-lanceolate cordate subcaudate shortly hairy on both surfaces, peduncles long laxly 1–3 fld., sepals lanceolate acuminate, corolla somewhat large, seeds glabrous.

MALABAR and CONCAN; *Stocks, Law,* &c.

Resembling generally (when dry) *I. obscura*. *Leaves* 3½ in., deeply cordate, finely acuminate. *Pedicels* often 1½ in. *Sepals* ⅓ in., in flower sublinear, in fruit lanceolate, sparsely hairy. *Corolla* (very much withered) exceeding 1 in. *Capsule* nearly ½ in., ovoid-oblong, glabrous, 4-valved, 4-seeded.—Referred in *Herb. Ind. Or. H. f. & T.* possibly to a var. of *I. obscura*, which the large flowers and glabrous seeds will not admit. From the unusually narrow sepals it may be the Malabar plant which Willdenow (and Choisy) have placed with Burmann's *Convolvulus gemellus*.

32. **I. sibirica,** *Pers. Syn.* i. 183; nearly glabrous, leaves triangular-lanceolate cordate entire or undulate, peduncles shorter than the petioles 1–4-fld., sepals ovate mucronate, corolla small white, seeds glabrous. *Chois. in DC. Prodr.* ix. 377. Convolvulus sibiricus, *Linn. Mant.* 203. C. rupestris, *Pallas Voy.* (*ed. Gauthier*) iv. 369, t. 17.

WESTERN HIMALAYA; Kumaon; Naini Tal, alt. 6000 ft., *Strachey & Winterbottom.*—DISTRIB. Siberia, N. China (near Pekin, *Maximowicz*).

Annual, twining. *Leaves* 3 by 2 in.; petiole 2 in. *Peduncles* $\frac{1}{2}$–$1\frac{1}{2}$ in.; bracts linear, deciduous; pedicels $\frac{1}{8}$–1 in., racemose or subumbellate. *Sepals* $\frac{1}{5}$ in., glabrous. *Corolla* $\frac{2}{3}$ in., campanulate, glabrous, often yellowish near the base. *Anthers* never twisted. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., ovoid, glabrous, 2-celled, 2-valved, 4–2-seeded. *Seeds* ellipsoid, glabrous.—The Indian specimen is rather more developed, both in leaf and cyme, than the original Linnæan type, but is identical with the specimens collected by Pallas.

33. **I. poranoides,** *Clarke*; glabrous, leaves ovate-lanceolate cordate caudate entire, cymes peduncled many-flowerd lax, bracts ovate mucronate persistent, sepals ovate obtuse unequal, corolla small white.

SIKKIM and BRITISH BHOTAN; alt. 3–5000 ft., frequent, *Clarke*.

Scandent, twining. *Leaves* 3 by 2 in.; petiole $1\frac{1}{2}$ in. *Peduncles* 1–3 in.; bracts $\frac{1}{4}$–$\frac{3}{4}$ in., at the divisions of the divaricate cyme. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous. *Corolla* $\frac{3}{4}$ in., subcampanulate, glabrous, white, often yellowish near the base. *Anthers* never twisted. *Capsule* $\frac{1}{3}$ in., subglobose, smooth, 2-celled, 2–4-valved, normally 4-seeded. *Seeds* glabrous.—By the prominent persistent bracts, this species is not likely to be confounded with any other *Ipomœa*; but it has probably been passed for *Porana racemosa*, which it somewhat resembles in its scandent habit and numerous white flowers in lax cymes.

34. **I. cynanchifolia,** *Clarke*; hairy, leaves ovate-lanceolate cordate acuminate entire, peduncles 0, pedicels racemose or subfasciculate, bracts caducous, sepals lanceolate elongate, corolla small rose, capsule glabrous. Convolvulus cynanchifolius, *Wall. Cat.* 1399.

SIKKIM and BHOTAN; alt. 2–5000 ft., frequent, *Clarke*.—DISTRIB. Burma.

Scandent, twining. *Leaves* 3 by $1\frac{1}{2}$ in., more or less hairy; petiole 1–2. *Pedicels* $\frac{1}{4}$ in., rigid, fascicled, or forming a raceme 1–2 in., recurved in fruit. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., hirsute, blackish green, widening in fruit. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., campanulate, glabrous, with a dark spot at the base. *Anthers* never twisted. *Ovary* 2-celled, 4-ovuled; stigma small, of 2 subsessile globes. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., subglobose, 2-celled, usually 4-seeded. *Seeds* glabrous.—Regarded by Choisy (in *DC. Prodr.* ix. 366) as identical with *I. eriocarpa*, from his never having seen Wallich's specimens. *I. cynanchifolia* is very near *I. calcina*, Benth, but the sepals (even in fruit) are not cordate.

35. **I. Glenieii,** *Thwaites in litt.*; glabrous, leaves subcordate elongate-oblong entire, peduncles 1-fld. ebracteate, sepals ovate subacute, corolla middle-sized subcampanulate.

CEYLON; *Thwaites*.

Creeping, hardly twining. *Leaves* 2 by $\frac{1}{2}$ in., shallowly cordate, gradually narrowed from the very base to the apex, not acuminate, undulate; petiole 1 in. *Peduncles* $\frac{1}{4}$–$\frac{1}{3}$ in. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., obscurely muricate. *Corolla* $\frac{3}{4}$ in., tube $\frac{1}{6}$–$\frac{1}{5}$ in. broad.—Described from a fragment which flowered at Kew in 1871; it appears very distinct.

36. **I. denticulata,** *Chois. in DC. Prodr.* ix. 379, *not of R. Br.*; glabrous, leaves ovate-cordate acute entire denticulate angular or somewhat lobed, peduncles short 1–3-fld., pedicels long, sepals elliptic suddenly acute, corolla $1\frac{1}{2}$ in. purple. *Benth. Fl. Austral.* iv. 421. I. subdentata, *Miq. Fl. Ind. Bat.* ii. 614. I. littoralis, *Thwaites Enum.* 211, *not of Blume*. I. cymosa, *Baker Fl. Maurit.* 208, *not of Roem. & Sch.* I. nicobarica, *Kurz in Journ. As. Soc.* 1876. pt. 2, 141. Convolvulus denticulatus, *Lamk. Enc.* iii. 540.—Ipomæa, n. 42, *Herb. Ind. Or. H. f. & T.*

MALAY PENINSULA; from Mergui (*Griffith*) southwards. CEYLON; near the sea at Galle, *Thwaites*. NICOBARS; *Kurz*.—DISTRIB. Malaya, Australia, Polynesia, Seychelles.

Stems trailing, somewhat twining. *Leaves* 1–$2\frac{1}{2}$ in., deeply cordate, not fleshy;

petiole 1½ in. *Peduncles* 0–1½ in., often 1-fld.; bracts ⅛ in., linear; pedicels often 1 in. or longer. *Sepals* nearly ½ in., somewhat scarious. *Corolla* widely tubular-funnel-shaped. *Ovary* 2-celled, not at all 4-celled. *Capsule* globose, glabrous. *Seeds* smooth.

37. **I. fastigiata,** *Sweet Hort. Brit.* ed. 2, 372; minutely puberulo-scabrous or glabrate, leaves ovate-cordate acute entire or lower lobed, peduncles long many-fld., pedicels short, sepals elliptic suddenly acute, corolla 1½–2 in. purple. *Chois. Convolv. Or.* 84, and in *DC. Prodr.* ix. 380; *Meissn. in Mart. Brasil.* vii. 267, *with syn.* Convolvulus fastigiatus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 468, and *ed. Carey & Wall.* ii. 48, *not of Wall.*

BENGAL, *Roxburgh.* Introduced from America.

Extensively scandent, twining. *Leaves* 3–4 in., mostly entire (in the Indian plant), those on the runners often lobed; petiole often 3–5 in. *Peduncles* 1–4 in.; bracts caducous; cymes dense, pedicels rarely exceeding ½ in. *Flower* and *fruit* very nearly as of *I. denticulata*, from which it differs little except in its numerous shorter pedicels.—A common American species, introduced in S. E. Asia. Miquel (*Fl. Ind. Bat.* ii. 616). Roxburgh describes it as a native of the interior of Bengal, and in flower most part of the year, but no one has met with the plant wild.

38. **I. sepiaria,** *Koen.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 500, and *ed. Carey & Wall.* ii. 90; leaves ovate-cordate acute entire glabrous or somewhat pubescent, peduncles long, pedicels short subumbelled clavate in fruit, sepals ovate subobtuse, corolla largeish pale-purple or white with a dark eye, seeds furred. *Chois. Convolv. Or.* 82, and in *DC. Prodr.* ix. 370; *Wight Ic.* t. 838; *Dalz. & Gibs. Bomb. Fl.* 166, *not of Benth.* I. striata, *Roth Nov. Sp.* 111. I. Heynii, *Wall. Cat.* 1387 (*Choisy*, no specimen now in Herb. Wall.). Convolvulus maximus *and* striatus, *Vahl Symb.* iii. 26, 28. C. marginatus, *Lamk. Enc.* iii. 558. C. sepiarius *and* incrassatus, *Wall. Cat.* 1384, 1386.—*Rheede Hort. Mal.* xi. t. 53.

Throughout INDIA; from Hindostan to Malacca, frequent. CEYLON, common.—DISTRIB. Malaya.

Perennial, twining, glabrous or in places pubescent or hirsute. *Leaves* 1–2½ in., entire or sinuate, rarely lobed, basal lobes usually rounded; petiole 1–2 in. *Peduncles* ½–7 in., usually long; bracts small, lanceolate, caducous; pedicels 0–½ in. *Sepals* ⅓ in., obscurely pubescent. *Corolla* often 1½ in. and upwards; tube cylindric, dark purple within; mouth suddenly widened. *Capsule* ¼–⅓ in., ovoid, 4–2-seeded.—*Convolvulus triflorus*, Vahl Symb. iii. 30 (*Ipomœa triantha*, Roem. & Sch. Syst. iv. 243; Chois. Convolv. Or. 83, *and in* DC. Prodr. ix. 370), is only known by Vahl's description. Choisy does not see how it differs from *I. sepiaria*; but Vahl states that the pedicels are about as long as the peduncles, which is not the case in *I. sepiaria*. It may have been *Ipomœa denticulata*.

VAR. *stipulacea*; leaves more elongate often angular or lobed sometimes hastate with basal lobes acute, stipules obscure minute, sepals rather larger, corolla shorter, than in *I. sepiaria type.* I. stipulacea, *Sweet Hort. Brit.* ed. 2, 372; *Chois. Convolv. Or.* 84, and in *DC. Prodr.* ix. 379. I. subtrilobans, *Miq. Fl. Ind. Bat.* ii. 615. Convolvulus stipulaceus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 484, and *ed. Carey & Wall.* ii. 71.—Bengal Plain and Chittagong; *Roxburgh*, &c., not rare.—Miquel's *I. subtrilobans* is intermediate between *I. sepiaria* and this.

39. **I. Beladamboe,** *Roem. & Sch. Syst.* iv. 233; glabrous or nearly so, leaves ovate-cordate entire, peduncles short or long stout many-fld., sepals ovate obtuse, corolla large purplish or white, seeds glabrous. I. rugosa, *Chois. Convolv. Or.* 64, and in *DC. Prodr.* ix. 350; *Wight Ic.* t. 887. I. repens, *Lamk. Enc.* vi. 18, *not of Roth.* Convolvulus rugosus, *Rottl.*; *Willd. in Act. Berol.* iv. 196. C. flagelliformis, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 481, and

ed. Carey & Wall. ii. 68; *Wall. Cat.* 1397. C. Beladambu, *Spreng. Syst.* i. 608, and *curæ post.* 62.—*Rheede Hort Mal.* xi. t. 58.

S. DECCAN PENINSULA; *Wight*, &c. CEYLON, abundant in damp fields.

Extensively trailing. *Leaves* 3–4 in. diam., subobtuse; petiole 1–$2\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$–$4\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., lanceolate, deciduous; pedicels $\frac{1}{3}$ in., stout, somewhat thickened upwards in fruit. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., unequal, outer often shorter, glabrous, wrinkled when young. *Corolla* $\frac{1}{2}$–2 in., purple in the dried examples, pure white in Roxburgh's figure. *Capsule* $\frac{1}{3}$ in., globose, glabrous, 4-seeded.

40. **I. aquatica,** *Forsk. Fl. Æg. Arab.* 44; glabrous or nearly so, leaves elliptic-oblong cordate or hastate or elongate entire or angular sublobed, peduncles long few-fld., pedicels long, sepals ovate obtuse, corolla large purple, seeds minutely closely silky. I. reptans, *Poir. Enc. Suppl.* iii. 460; *Blume Bijd.* 714; *Chois. Convolv. Or.* 62, and in *DC. Prodr.* ix. 349; *Dalz. & Gibs. Bomb. Fl.* 164. I. repens, *Roth Nov. Sp.* 110. I. subdentata, *Miq. Fl. Ind. Bat.* ii. 614. Convolvulus reptans, *Linn.*; *Roxb. Hort. Beng.* 14. C. repens, *Vahl Symb.* i. 17; *Roxb. Fl. Ind.* i. 432, and *ed. Carey & Wall.* ii. 68; *Blume Bijd.* 713; *Wall. Cat.* 1355, *not of Linn.* C. Adansonii, *Lamk. Enc.* iii. 560. —*Rumph. Herb. Amb.* v. t. 155, fig. i. *Rheede Hort. Mal.* xi. t. 52.

Throughout INDIA, common; abundant in Bengal Plain. CEYLON; borders of tombs, and cult. as a vegetable, *Thwaites.*—DISTRIB. Tropical Asia, Australia, Africa.

Annual; stems trailing on mud, and floating, sometimes to a great length, hollow. *Leaves* 3–6 in.; petiole 1–6 in., usually very long. *Peduncles* 2–7 in., 1–5-flowered; bracts inconspicuous; pedicels often 1–2 in. *Sepals* $\frac{1}{3}$ in., glabrous or nearly so. *Corolla* 2 in., usually pale purple, glabrous. *Capsule* $\frac{1}{3}$ in., ovoid, glabrous, 4–2-seeded. *Seeds* most minutely hairy, or very nearly glabrous.

41. **I. salicifolia,** *Roxb. Fl. Ind.* i. 498, and *ed. Carey & Wall.* ii. 88; glabrous, leaves short-petioled linear-lanceolate base rhomboid or rounded, peduncles very short 1–3-fld., sepals broadly elliptic subobtuse, corolla large white. *Chois. in DC. Prodr.* ix. 367. I. Buchananii, *Chois. Convolv. Or.* 92.

BENGAL; Rungpore, *Hamilton.*

Only known from Roxburgh's description and his *Ic. Ined.* at Kew. Biennial stem twining. *Leaves* 7 by 1 in., acuminate; petiole $\frac{1}{2}$ in. *Peduncles* 0–$\frac{1}{4}$ in.; bracts $\frac{1}{5}$ in., linear-lanceolate; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in. *Sepals* $\frac{3}{4}$ by $\frac{1}{3}$ in. *Corolla-tube* $1\frac{3}{4}$ by $\frac{1}{5}$ in., cylindric; mouth $2\frac{1}{4}$ in. diam. *Capsule* nearly $\frac{1}{2}$ in. diam., globose, glabrous. *Seeds* $\frac{1}{4}$ in., oblong, black, apparently (from the figure) minutely hairy.—Roxburgh describes the capsule as 2-celled, with 3 seeds in each cell, which is hard to believe; in his picture, the stigma is distinctly 2-lobed, while the capsule seems 3-valved.

42. **I. staphylina,** *Roem. & Sch. Syst.* iv. 249; glabrous, leaves ovate subcordate, peduncles short many-fld. laxly racemose-paniculate, sepals ovate obtuse, corolla middle-sized purplish white, seeds with silky hairs $\frac{1}{4}$ in. long. *Chois. Convolv. Or.* 78. I. racemosa, *Roth Nov. Sp.* 115, *not of Poir.*; *Chois. in DC. Prodr.* ix. 371; *Wight Ill.* t. 168. Convolvulus malabaricus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 469, and *ed. Carey & Wall.* ii. 49, *all syn. excl.*; *Wall. Cat.* 1341. C. racemosus, *Roem. & Sch. Syst.* iv. 302. C. Kleinii, *Spreng. Syst.* i. 606, *and curæ post.* 61. C. polyanthus, *Wall. Cat.* 1378. C. gangeticus, *Wall. Cat.* 1340, *by admixture.*

S. DECCAN PENINSULA; common. ASSAM; *Jenkins.* PENANG; *Wallich.*

Shrubby, subscandent. *Leaves* 4 by $2\frac{1}{2}$ in., subacute, not acuminate, prominently nerved; petiole 1–2 in. *Peduncles* $\frac{1}{2}$–2 in., usually shorter than the petioles, numerous, often panicled towards the end of the branches; bracts small, caducous; pedicels 0–$\frac{1}{4}$ in., mostly short. *Sepals* $\frac{1}{5}$ in., glabrous. *Corolla* 1 in., purplish in the tube, mouth nearly white. *Capsule* $\frac{1}{3}$ in., ovoid, subacute, 4-seeded.

43. **I. campanulata,** *Linn.*; *Chois. Convolv. Or.* 69, and in *DC. Prodr.* ix. 359; leaves cordate-ovate acute entire glabrous or very nearly so, corymbs compound stout, sepals $\frac{1}{4}$–$\frac{1}{3}$ in. ovate obtuse puberulous, corolla 1$\frac{1}{2}$–3 in. campanulate purple lobes triangular-lanceolate, seeds with very long silky hair. *Dcne. in Nouv. Ann. Mus.* iii. 392; *Wight Ic.* t. 1375; *Dalz. & Gibs. Bomb. Fl.* 165; *Kurz For. Fl.* ii. 218. Convolvulus campanulatus, *Spreng. Syst.* i. 608. C. platypeltis, *Spanoghe in Linnæa*, 1841, 338.—*Rheede Hort. Mal.* xi. t. 56.

DECCAN PENINSULA; frequent. MALAY PENINSULA; from Prome southwards.—CEYLON; in the warmer parts of the Island.—DISTRIB. Malay Archipelago.

A large twiner; nearly glabrous, young parts hoary. *Leaves* 3–4 in., nerves prominent; petiole 2–3 in. *Peduncles* 1–4 in., stout; bracts early deciduous; corymbs 2–5 in. diam., 10–40-flowered. *Sepals* hoary, in fruit somewhat enlarged $\frac{1}{3}$ in. diam. glabrate. *Corolla* very variable in size, always prominently lobed, glabrous or nearly so. *Capsule* $\frac{1}{2}$ in. diam., globose. *Seeds* with hairs often more than $\frac{1}{2}$ in. long.—Resembles *Rivea tiliæfolia* (Thwaites).

VAR. *illustris*; leaves ovate or oblong cordate or hastate, corymbs often few-flowered, sepals nearly glabrous, corolla often 4 in. shallowly or deeply lobate.—Malay Peninsula, from Moulmein southwards.—DISTRIB. Malay Islands.—The size and lobation of the corolla vary so greatly that there may be two species here; a Moulmein example collected by Parish has the corolla 4$\frac{1}{4}$ in., very shallowly lobed, the calyx glabrate, and is very different from the Malabar ones with corolla only 1$\frac{1}{2}$ in. long. Miquel must be mistaken in saying (*Fl. Ind. Bat.* ii. 606) that Spanoghe's *I. campanulata* cannot be Linnæus' *I. campanulata* because the seeds are woolly; for Linnæus' species is founded on Rheede's picture (*Hort. Mal.* xi. t. 46), which (and the description) attributes silky seeds to the species.

44. **I. Gomezii,** *Clarke*; leaves ovate-cordate acute entire glabrous, corymbs peduncled few-fld., sepals 1–1$\frac{1}{2}$ in. elliptic glabrous, corolla very large.

TAVOY; *Gomez*. ANDAMANS; *Kurz*.

A large climber, resembling *I. campanulata*, var. *illustris*, but with a much larger calyx. *Leaves* 3–6 in., sinus wide, nerves prominent; petiole 2 in. *Peduncles* 1–3 in., stout; bracts caducous. *Sepals* in young fruit erect, much imbricate. *Corolla* 4 by 3 in., campanulate.—The Malay *I. peltata*, Choisy, resembles this, but has a smaller calyx and peltate leaves.

45. **I. cymosa,** *Roem. & Sch. Syst.* iv. 241; softly hairy or glabrous, leaves cordate or hastate elliptic or oblong obtuse or shortly acute entire or angular or toothed, peduncles shorter than the leaves, cymes compact, sepals $\frac{1}{4}$–$\frac{1}{3}$ in. elliptic, corolla middle-sized pure white or tinged yellow, seeds patently hirsute. *Blume Cat. Gewass. Java*, 50; *Chois. Convolv. Or.* 79, and in *DC. Prodr.* ix. 371; *Bot. Reg.* 1843, t. 24. I. bifida, *Roth Nov. Sp.* 118. I. Heynei *and* Rothii, *Roem. & Sch. Syst.* iv. 237, 241. I. Olanda, *Sweet Hort. Brit.* (2 ed.) 372. I. caliginosa, *Chois. Convolv. Or.* 79, and in *DC. Prodr.* ix. 370. Convolvulus cymosus, *Lamk. Enc.* iii. 556. C. blandus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 470, and *ed. Carey & Wall.* ii. 50, 70; *Wall. Cat.* 1342. C. pentagonus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 485, and *ed. Carey & Wall.* ii. 72; *Wall. Cat.* 1343. C. Rothii, *Spreng. Syst.* i. 600. C. umbellatus, *Wall. Cat.* 2329.—*Rumph. Herb. Amb.* v. t. 158.

Abundant throughout INDIA (except the N.W. dry area), alt. 0–4000 ft. CEYLON; very common.—DISTRIB. Malaya, Australia, Tropical Africa.

Scandent, twining. *Leaves* 1$\frac{1}{2}$–4 in., nerves prominent subparallel; petiole $\frac{1}{6}$–$\frac{2}{3}$ in., mostly short. *Peduncles* $\frac{1}{6}$–2 in.; bracts caducous; pedicels $\frac{1}{6}$–1 in. *Sepals* obtuse or mucronate, hairy or glabrous. *Corolla* 1–1$\frac{1}{2}$ in., tubular-funnel-shaped; in buds hirsute at the tip. *Capsule* $\frac{1}{3}$ in. diam., globose, glabrous. *Seeds* with blacker, stiffer, more patent hairs than in the allied species.

VAR. *macra*; larger in all parts, peduncles sometimes 4–6 in., sepals $\frac{3}{4}$ in., corolla 2 in.—Sikkim, Assam and Khasia Mts., alt. 0–4000 ft., *Griffith, J. D. H.*, &c.—*Leaves* 5 by 3 in.; petiole 3–4 in. *Seeds* exactly as of *I. cymosa*, but considered as a variety by Bentham (*Fl. Austral.* iv. 423).

46. **I. petaloidea,** *Chois. Convolv. Or.* 69, and in *DC. Prodr.* ix. 360; glabrous, leaves ovate acute many of the upper lanceolate, peduncles short, bracts caducous, flowers subracemose, corolla large yellow shaggy without. *Dcne. in Nouv. Ann. Mus.* iii. 392. I. xanthantha, *Kurz For. Fl.* ii. 219. Convolvulus crispatulus, *Wall. Cat.* 1403.

N. OUDH; *R. Thomson.* All over PROME and PEGU; *Kurz.*—DISTRIB. Timor.

Large, scandent. *Leaves* 5 by $3\frac{1}{2}$ in., base rounded or subcordate; upper $3\frac{1}{2}$ by $\frac{3}{4}$ in., base obtuse; petiole $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$–1 in.; pedicels often 1 in. *Sepals* $\frac{2}{3}$ in., elliptic-ovate, obtuse or subacute, glabrous, hardly altered in fruit. *Corolla* $1\frac{3}{4}$ in., wide-tubed. *Stamens* inserted low down the tube; anthers ultimately twisted. *Capsule* $\frac{1}{2}$ in., ovoid. *Seeds* minutely velvety, margins subvillous.

VAR. *pauciflora*; leaves smaller all oblong-lanceolate, peduncles 1-fld. rarely 2-fld. Ipomæa, n. 44, *Herb. Ind. Or. H. f. & T.*—Kumaon; *Thomson.*—Though Dr. Thomson collected lower parts of the stem, there are no ovate leaves.

47. **I. Turpethum,** *Br. Prodr.* 485; softly pubescent or glabrate, leaves ovate or oblong not acuminate, cymes few-fld., sepals ovate in fruit much enlarged, corolla largeish white, seeds smooth. *Bot. Reg.* t. 279; *Chois. Convolv. Or.* 68, and in *DC. Prodr.* ix. 360; *Dalz. & Gibs. Bomb. Fl.* 165; *Kurz For. Fl.* ii. 218. I. anceps, *Roem. & Sch. Syst.* iv. 231; *Blume Bijd.* 714; *Chois. Convolv. Or.* 68, and in *DC. Prodr.* ix. 360. I. triquetra, *Roem. & Sch. Syst.* iv. 231. Convolvulus Turpethum, *Linn.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 476, and *ed. Carey & Wall.* ii. 57; *Wall. Cat.* 1371; *Bot. Mag.* t. 2093; *Wight in Hook. Bot. Misc.* iii. 297, *suppl.* t. 38; *Hassk. Pl. Jav. Rar.* 518. C. anceps, *Linn. Mant.* 43. C. triqueter, *Vahl Symb.* iii. 30. Spiranthera Turpethum, *Bojer Hort. Maurit.* 226. Operculina Turpethum, *Manso Brasil.* 16, 49. Argyreia alulata, *Miq. Fl. Ind. Bat.* ii. 587.

Throughout INDIA, alt. 0–3000 ft., and CEYLON, common.—DISTRIB. S.E. Asia, Malaya, Australia, Polynesia, Seychelles, Mauritius.

Stems stout, twining, quadrangular, winged, compressed, or nearly round. *Leaves* 2–5 in., base cordate or obtuse; petiole 1 in. *Peduncles* 1–4 in.; bracts 1 in., oblong, caducous, often pinkish; pedicels $\frac{1}{4}$–1 in. *Sepals* $\frac{1}{2}$ in., usually softly pubescent; in fruit 1 in., orbicular, concave, scarious or subsucculent. *Corolla* $1\frac{1}{2}$ in., tubular-campanulate. *Anthers* soon twisting. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., globose, normally 4-seeded.

48. **I. biloba,** *Forsk. Fl. Æg.-Arab.* 44; glabrous, leaves orbicular obtuse emarginate or 2-lobed, peduncles 1–3-fld., sepals ovate obtuse, corolla large purple, seeds villous. I. maritima, *Br. Prodr.* 486; *Blume Bijd.* 720; *Bot. Reg.* t. 319. I. Pes-Capræ, *Roth Nov. Sp.* 109; *Chois. Convolv. Or.* 63, and in *DC. Prodr.* ix. 349; *Dalz. & Gibs. Bomb. Fl.* 164; *Meissn. in Mart. Brasil.* vii. 256, *with syn.* Convolvulus Pes-Capræ, *Linn.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 486, and *ed. Carey & Wall.* ii. 74; *Wall. Cat.* 1360. C. maritimus, *Lamk. Enc.* iii. 550. C. bilobatus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 485, and *ed. Carey & Wall.* ii. 73; *Wall. Cat.* 1359. Batatas maritima, *Bojer Hort. Maurit.* 225.—*Rumph. Herb. Amb.* v. t. 159, fig. i. *Rheede Hort. Mal.* xi. t. 57.

Throughout INDIA and CEYLON; near the sea, abundant.—DISTRIB. Seashore of both hemispheres throughout the tropics.

Extensively creeping and twining. *Leaves* 1–4 in., often broader than long, fleshy, prominently nerved; petiole 1–4 in. *Peduncle* 1–4 in.; bracts $\frac{1}{5}$ in., lanceolate,

caducous; pedicels often more than 1 in. *Sepals* ½–⅔ in.; in fruit widened. *Corolla* 2 in., tubular-funnel-shaped, glabrous, margin scarcely lobed. *Ovary* 2-celled, not imperfectly 4-celled. *Capsule* ½ in., ovoid, glabrous.

49. **I. carnosa,** *Br. Prodr.* 485; glabrous or nearly so, leaves lobed or oblong emarginate, peduncles 1–3-fld., sepals ovate obtuse, corolla largeish ochroleucous, seeds villous. *Benth. Fl. Austral.* iv. 419. I. acetosæfolia, *Roem. & Sch. Syst.* iv. 246; *Meissn. in Mart. Fl. Brasil.* vii. 255, t. 94. I. longifolia, *Benth. Pl. Hartw.* 16; *Bot. Reg.* 1840, t. 21. I. littoralis, *Boiss. Fl. Orient.* iv. 112. Convolvulus littoralis, *Linn. Sp. Pl.* 227. C. acetosæfolius, *Vahl Ecl.* i. 18. C. arenarius, *Vahl Symb.* i. 18. C. carnosus, *Spreng. Syst.* i. 609. C. stoloniferus, *Cyr. Pl. Rar.* i. t. 5. Batatas littoralis *and* acetosæfolia, *Chois. Convolv. Or.* 124, and in *DC. Prodr.* ix. 337, 338.

MALACCA; *Griffith.*—DISTRIB. Tropical seashores of both hemispheres.

Very near *I. biloba.* *Leaves* often deeply lobed, sometimes subentire emarginate, but then much more elongate than those of *I. biloba*, oblong or linear, or often fiddle-shaped; nerves much more obscure. *Ovary* completely 2-celled, imperfectly 4-celled. *Capsule* and seeds exactly as of *I. biloba.*

50. **I. vitifolia,** *Sweet Hort. Brit.* ed. 2, 372; hairy, leaves cordate palmately 5-lobed, peduncles 1–7-fld., sepals ovate-acute hirsute, corolla middle-sized sulphur-coloured, seeds glabrous. *Blume Bijd.* 709; *Chois. Convolv. Or.* 72, and in *DC. Prodr.* ix. 361; *Dalz. & Gibs. Bomb. Fl.* 165; *Kurz For. Fl.* ii. 219. I. angularis, *Chois. Convolv. Or.* 72. Convolvulus vitifolius, *Linn. Mant.* 203; *Burm. Fl. Ind.* 45, t. 18, fig. 1; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 476, and *ed. Carey & Wall.* ii. 61; *Wall. Cat.* 1348. C. angularis, *Linn. Mant.* 203; *Burm. Fl. Ind.* 46, t. 19, fig. 2; *Hassk. Pl. Jav. Rar.* 519.

Throughout INDIA (except the dry N.W.); from Sikkim, Assam, Chittagong and Burma, southwards to Ceylon and Malacca.—DISTRIB. Malay Islds.

A large climber. *Leaves* 2–6 in. diam.; lobes triangular, acute, often toothed or acutely lobed; petiole ½–2 in. *Peduncles* 1–4 in. *Sepals* ⅓ in., often ¾ in. in fruit. *Corolla* 1½ in., campanulate. *Capsule* ½ in. diam., depressed globose, membranous, 2-celled, normally 4-seeded.

51. **I. pilosa,** *Sweet Hort. Brit.* ed. 2, 372; hairy, leaves ovate-cordate acute often deeply 3-lobed white woolly beneath, cymes peduncled persistently bracteate, corolla small purple, seeds pubescent margins silky. *Chois. Convolv. Or.* 86, and in *DC. Prodr.* ix. 363; *Wight Ic.* t. 837; *Dalz. & Gibs. Bomb. Fl.* 166. I. dichroa, *Chois. in DC. Prodr.* ix. 364. Convolvulus pilosus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 473, and *ed. Carey & Wall.* ii. 55. C. albicans, *Wall. Cat.* 1401. C. dichrous, *Roem. & Sch. Syst.* iv. 263.

W. HIMALAYA, alt. 1–3000 ft., PUNJAB and SCINDE; frequent. BENGAL; *Wallich.* —DISTRIB. Tropical Africa.

Annual, twining, patently hirsute. *Leaves* 2–4 in., lobes acuminate, often narrower below; petiole 2 in. *Peduncles* 1–3 in.; bracts ¼ in., linear-lanceolate; pedicels usually ¼–¾ in. *Sepals* ½ in. and upwards, narrow-lanceolate, acuminate. *Corolla* ¾ in., narrowly funnel-shaped, with scattered long hairs without. *Capsule* ⅓–½ in., ovoid-globose, glabrous, 4-valved, normally 4-seeded.

†† *Leaves divided, or very deeply lobed.*

52. **I. kentrocaulos,** *Clarke*; glabrous, leaves deeply palmate segments elliptic-lanceolate acuminate entire, peduncles many-fld., sepals 1 in. elliptic-oblong, corolla large, seeds ⅛ in. glabrous. I. tuberosa, *A. Rich. Fl. Abyss.* ii. 67; *Chois. in DC. Prodr.* ix. 362, *the old-world plant, not of Linn.* C. panicu-

latus, *Wall. Cat.* 1350, Heyne's *Ipomœa tuberosa* only. Convolvulus kentrocaulos, *Steud. in Pl. Schimp.* n. 800. C. formosus, *Roxb. Ic. Ined.*

N.W. INDIA; *Royle.* DECCAN PENINSULA; *Rottler, Wight,* &c. CEYLON.—DISTRIB. Malaya, Tropical Africa.

Stem stout, twining, muricate or smooth. *Leaves* 3–5 in. diam.; petiole 2–5 in. *Peduncles* 2–6 in.; bracts deciduous; pedicels $\frac{1}{4}$–1 in. *Sepals* narrow; in fruit $1\frac{1}{4}$ by $\frac{1}{2}$ in., subpatent, hardly imbricated. *Corolla* 2 in., tubular-campanulate. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., globose.—In *I. tuberosa,* Linn., the fruiting-sepals are ·1–$1\frac{1}{2}$ in. broad, concave, much imbricate, seeds $\frac{2}{3}$ in., furred; see *Trans. Hort. Soc. Lond.* i. 184, t. 11.

53. **I. sinuata,** *Ortega Dec.* 84; leaves palmate glabrous or nearly so, leaflets narrowly lanceolate toothed or pinnatifid, peduncles 1–2-fld., sepals nearly 1 in. elliptic-oblong glabrous, corolla middle-sized, seeds glabrous or nearly so. *Chois. in DC. Prodr.* ix. 362. I. dissecta, *Chois. l. c.* 363, *as to the Indian material, not of Willd.* Convolvulus dissectus, *Linn. Mant.* 204; *Jacq. Hort. Vindob.* ii. 74, t. 159. C. Kleinii, *Wall. Cat.* 1377.

Introduced from tropical AMERICA; N.W. India; *Royle.* Hindostan; *Thomson.* Bengal; *Jenkins, Rottler, Wight,* &c.—Native of tropical America, widely spread in the Old World.

Stems twining, hirsute or glabrous. *Leaves* 2–4 in. diam., sometimes hirsute on the midrib. *Corolla* $1\frac{1}{4}$ in., campanulate, white, throat purple. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., glabrous, 2-celled, normally 4-seeded. *Seeds* $\frac{1}{4}$ in.

54. **I. rhyncorhiza,** *Dalz. in Hook. Kew Journ.* iii. 179; leaves deeply palmate sparsely hispidulous segments oblong lobed or pinnatifid, peduncles 1–2-fld., sepals $\frac{1}{3}$ in. elliptic-lanceolate unequal glabrous, corolla middle-sized yellow. *Dalz. & Gibs. Bomb. Fl.* 167.

The CONCAN; Syhadree Mts. (Bombay), Tulkut Ghat, *Dalzell*; Concan, *Stocks.*

Root tuberous; stems filiform, twining, glabrous. *Leaves* 3 in. diam.; lobes obtuse or mucronate; petiole 1 in. *Peduncles* 2–4 in.; bracts $\frac{1}{6}$ in., linear. *Corolla* $1\frac{1}{4}$ in. by 2 in. diam. *Fruit* not known.

55. **I. quinata,** *Br. Prodr.* 486; leaves palmate, leaflets lanceolate entire, peduncles 1–2-fld., sepals $\frac{1}{5}$ in. elliptic glabrous or nearly so, corolla rather large, seeds glabrous shining apex crested. *Chois. in DC. Prodr.* ix. 385; *Benth. Fl. Austral.* iv. 415. I. hirsuta, *Br. Prodr.* 486. I. pentadactylis, *Chois. l. c.* Convolvulus tenuifolius, *Vahl Symb.* iii. 33. C. quinatus and Brownii, *Spreng. Syst.* i. 590. C. pentadactylis, *Wall. Cat.* 1367. C. munitus, *Wall. Cat.* 1354, as to Hamilton's *Convolvulus tenuifolius* only.

CHOTA NAGPORE; frequent, *Clarke.*—DISTRIB. Burma; S. China, N. Australia.

Stems prostrate, hardly twining, patently fulvous-hirsute or glabrous. *Leaves* 3–4 in. diam., glabrous or with patent fulvous hairs; leaflets obtuse or subacute, not acuminate; petiole $1\frac{1}{2}$ in., mostly hairy. *Peduncles* shorter than the petioles; bracts $\frac{1}{8}$ in., linear, persistent. *Corolla* $1\frac{1}{4}$ in. and upwards, white or purplish. *Capsule* $\frac{1}{2}$ in., ovoid, subacute, glabrous, 2-celled, 4-valved, normally 4-seeded. *Seeds* $\frac{1}{4}$ by $\frac{1}{8}$ in.—Easily distinguished from all other *Ipomœas* by the crest of the seed.

56. **I. palmata,** *Forsk. Fl. Æg.-Arab.* 43; glabrous, leaves digitate nearly or quite to the base, lobes elliptic or lanceolate subentire, peduncles 3–1-fld., sepals ovate obtuse, corolla large purplish, seeds villous margins woolly. *Chois. Convolv. Or.* ix. 386; *Benth. Fl. Austral.* iv. 415; *Boiss. Fl. Orient.* i. 464. I. senegalensis, *Lamk. Ill.* i. 464. I. stipulacea, *Jacq. Hort. Schoenb.* ii. 39, t. 199. I. pendula, *Br. Prodr.* 486; *Andr. Bot. Rep.* t. 613; *Bot. Reg.* t. 632; *Chois. in DC. Prodr.* ix. 387 (syn. I. Horsfalliæ excl.). I. pulchella, *Roth Nov. Sp.* 115; *Wight Ic.* t. 156; *Chois. in DC. Prodr.* ix. 386. I. tuberculata, *Roem. & Sch. Syst.* iv. 208; *Chois. Convolv. Or.* 91, and in *DC. Prodr*

ix. 386. Convolvulus cairicus, *Linn.*; *Bot. Mag.* t. 699. C. tuberculatus, *Lamk. Enc.* iii. 545. C. bellus, *Spreng. Syst.* i. 590. C. digitatus, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 479, and *ed. Carey & Wall.* ii. 65. C. heptaphyllus, *Rottl.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind. ed. Carey & Wall.* ii. 66; *Wall. Cat.* 1353. C. lupulifolius, *Griff. Notul.* iv. 284.

DECCAN PENINSULA with CEYLON; *Rottler, Wight,* &c. MALACCA; *Maingay.*—DISTRIB. Tropical Asia, Africa, Australia, and America.

Perennial, twining, in age often tubercled. *Leaves* 1–3 in. diam.; petiole 1–2 in. *Peduncles* often as long as the petioles, often 3-fld.; bracts minute. *Sepals* $\frac{1}{4}$ in. *Corolla* $1\frac{1}{2}$ in., and upwards. *Capsule* nearly $\frac{1}{2}$ in. ovoid, glabrous, 2-celled, 2–4-valved, normally 4-seeded.

57. **I. dasysperma,** *Jacq. Ecl.* i. 132, t. 89; glabrous, leaves pedate lobes 5–7 unequal elliptic or lanceolate subentire, peduncles mostly 1-fld., sepals ovate obtuse, corolla large yellow with a purplish eye, seeds villous margins woolly. *Chois. Convolv. Or.* 90, and in *DC. Prodr.* ix. 386; *Hassk. Retzia,* i. 70. I. tuberculata, *Ker in Bot. Reg.* t. 86, *not of Roem. & Sch.?* Convolvulus dasyspermus, *Spreng. Syst.* i. 591. C. pedatus, *Roxb. Hort. Beng.* 14, and *Fl. Ind. ed. Carey & Wall.* ii. 63. *Wall. Cat.* 1352 (specimen not in Herb. Wall.).

SIMLA, *Lady Dalhousie.* ROHILCUND; *Edgeworth.* DECCAN PENINSULA; *Rottler, Wight.*

Probably a cultivated form of *I. palmata.* Roxburgh only knew it in cultivation. Pedate leaves occur, and 1-fld. peduncles are not rare in *I. palmata.* The only remaining differential character is the colour of the corolla; but this is by no means a pure yellow in *I. dasysperma*; the tube is purplish and there are often purplish streaks on the limb.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

1. I.? BIPEDUNCULATA, *Clarke*; large glabrous twiner, leaves ovate cordate acute, peduncles 2 in. paired in each axil, cymes dichotomous many-fld.—N.W. HIMALAYA; Sirmore, alt. 3–5000 ft., *Edgeworth.* *Leaves* 4 in., entire; petiole $2\frac{1}{2}$ in. *Peduncles* in pairs from each of the 4 axils on the branch, subquadrangular; cymes 6–10-fld. bracts 0 in young fruit; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{5}$ in., broad-elliptic, shortly acute, striated, glabrous. *Corolla* not seen. *Fruit* (imperfectly ripe), much exceeding the sepals, ovoid, glabrous, possibly indehiscent. *Seeds* 4, glabrous.—The example is imperfect, but can be matched with no other Indian plant.

2. I. COMPRESSA, *Gussone*; *Chois. in DC. Prodr.* ix. 388; wholly villous-hairy, stem twining compressed, leaves ovate-cordate entire, peduncles 1-fld. shorter than the leaves.—Raised from Indian seeds, in Hort. Boccon. 1825.

3. I. CUSPIDATA, *Don. Prodr.* 98; *Chois. in DC. Prodr.* ix. 388; leaves cordate cuspidate entire pubescent with rounded lobes, peduncles axillary solitary longer than the leaves many-fld., sepals linear acute hairy, style exceedingly short. NEPAL; *Hamilton.* Flores rose, a little larger than in *I. coccinea.* No Nepal plant with a very short style and linear sepals will answer to this.

4. I. MULTIFLORA, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 89, and *Ic. Ined. in Herb. Kew*; stems woody twining, leaves broad-cordate downy, peduncles as long as the leaves umbelliferous. Common, native in hedges and forests, *Roxburgh.* *Stem* woody, twining up and over trees. *Leaves* 3–4 in. diam., short acuminated; petiole 2–3 in. *Peduncles* 7–8 in. (in Roxburgh's picture); cyme close, compound; bracts 0; pedicels $\frac{1}{4}$ in. *Corolla* $2\frac{1}{2}$ in., pale rose. *Fruit* not described nor depicted.—Roxburgh's picture might do for *Argyreia Hookeri*; but it is not probable that Roxburgh ever obtained that species, and it is hardly possible he would say it was "common in hedges." It is not Wallich's *C. Roxburghii* (Cat. n. 1415), which is the type of *Argyreia Roxburghii,* Chois.

5. I. OVALIFOLIA, *Chois. in DC. Prodr.* ix. 357; said to be a native of India. There is no example thence; it is not = *I. microphylla*, Roth Nov. sp. 112, as Choisy supposed.

6. I. SIDÆFOLIA, *Chois. in DC. Prodr.* ix. 372; is native in America, not in India. It is Convolvulus zeylanicus, *Moon*; *Wall. Cat.* 1379.

7. I. TRIANTHA, *Roem. & Sch.* is perhaps *I. sepiaria, Koen.* (which see).

6. LEPISTEMON, *Blume.*

Character of *Ipomæa* subgenus *Euipomæa*, but filaments dilated at the base into 5 concave scales which arch over the ovary.—Species 4 (1 African, 3 Asiatic).

1. **L. Wallichii,** *Chois. Convolv. Or.* 61, and in *DC. Prodr.* ix. 348; hairy, leaves ovate-cordate acute entire or 3-lobed, cymes dense many-fld. short-peduncled, sepals elliptic-lanceolate acuminate, corolla $\frac{2}{3}$ in. tubular narrower in the middle. L. flavescens, *Wight Ic.* t. 1362, *not in Calc. Journ. Nat. Hist.* t. 5, fig. 6, *nor of Blume.* Convolvulus cephalanthus, *Wall. Cat.* 1402. C. binectariferus, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 47. Vallaris controversa, *Spreng. Syst. curæ post.* 65. Ipomæa Wallichii, *Steud. Nomencl. Bot.* Nemodon sp., *Griff. Notul.* iv. 286.

ASSAM, KHASIA MTS., SILHET, and CACHAR; ascending to 3000 ft.; *Wallich, H.f. & T.*, &c. MERGUI; *Griffith.*

Stems stout, scandent, fulvous-villous. *Leaves* 3–5 in., fulvous-hirsute on both surfaces; petiole 1–2 in. *Peduncles* 0–$\frac{1}{2}$ in.; cymes 10–30-fld.; bracts $\frac{1}{5}$ in., linear-lanceolate, deciduous; pedicels many attaining $\frac{1}{2}$ in. *Sepals* $\frac{1}{3}$ in., patently fulvous-hirsute, acuminate. *Corolla* slightly dilated, glassy at base; tube hairy without; mouth shortly widely funnel-shaped, yellowish, white, or dull grey. *Filaments* short, glabrous above; basal process papillose; anthers not twisted. *Ovary* 2-celled, 4-ovuled; style very short, and stamens in the lower part of the corolla-tube, stigmas 2 subglobose. *Capsule* $\frac{1}{4}$ in., ovoid, glabrous, 4-valved, 2-celled, normally 4-seeded. *Seeds* glabrous.—*L. flavescens, Blume*, a Javan species, has the sepals ovate subacute (not acuminate), the corolla rather shorter and wider at the base than in *L. Wallichii.* A *Lepistemon* from Borneo and the Philippines has the cymes almost capitate, densely grey strigose; but these 3 Asiatic species might perhaps be considered vars. of one.

7. HEWITTIA, *W. & A.*

A pubescent, twining herb. *Leaves* cordate, entire angular or lobed. *Peduncles* axillary; flowers few subcapitate or solitary; bracts linear-lanceolate. *Sepals* acute, outer larger, enlarged in fruit. *Corolla* campanulate, yellowish with a purple eye; limb 5-plaited. *Stamens* included; filaments linear, bases dilated. *Ovary* hirsute, 1- (or imperfectly 2-), celled, 4-ovuled; style filiform, stigmatic lobes 2 ovate-oblong. *Capsule* globose, 4-valved, 1-celled, normally 4-seeded. *Seeds* glabrous.

1. **H. bicolor,** *Wight Ic.* t. 835 (by misprint Heivetia), and *Ill. t.* 168, bis fig. 6 (Hewetia). Convolvulus bicolor, *Vahl Symb.* iii. 25; *Bot. Mag.* t. 2205; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 475, and *ed. Carey & Wall.* ii. 57; *Wall. Cat.* 1410. C. bracteatus, *Vahl Symb.* iii. 25. C. involucratus, *Ker in Bot. Reg.* t. 318, *not of Spreng.* Ipomæa bicolor, *Sweet Hort. Brit.* ed. 2, 372. I. timorensis, *Blume Bijd.* 711. I. bracteata, *Blume Bijd.* 711, *not of Willd. nor of Wight.* I. Weinmanni, *Roem. & Sch. Syst.* iv. 243. Calystegia Keriana, *Sweet Hort. Brit.* ed. 2, 370. Palmia bicolor, *Endl.*; *Dalz. & Gibs.*

Bomb. Fl. 163. Shuteria bicolor, *Chois. Convolv. Or.* 104, and in *DC. Prodr.* ix. 435; *Fl. des Serres*, t. 421. Ariseia Afzelii, *G. Don. Gen. Syst.* iv. 295. A. bracteata, *Hassk. Pl. Jav. Rar.* 516.

S.E. INDIA from Assam and Bombay to the Carnatic and Malacca; frequent.—DISTRIB. Malaya, Tropical Africa.

Perennial, pubescent or nearly glabrous. *Stems* twining. *Leaves* 2–4 in., some angular or lobed; petiole ½ in. *Peduncles* ½–5 in., 1- or oftener few-fld.; bracts ¼–½ in., narrowly lanceolate, a little below the calyx. *Sepals* ⅓–½ in., ovate, inner lanceolate, pubescent; in fruit enlarged, subscariose, reticulate. *Corolla* 1 in., somewhat widely campanulate, or shortly 5-lobed, hairy without. *Capsule* ¼ in., subglobose, hairy.

8. **CALYSTEGIA,** *R. Br.*

Prostrate or twining herbs, glabrous or nearly so. *Leaves* entire or lobed. *Peduncles* 1-fld.; bracts 2, large, enclosing the calyx, persistent. *Sepals* ovate or oblong, inner rather smaller. *Corolla* funnel-shaped or campanulate; limb 5-plaited, subentire. *Stamens* included. *Ovary* 1- (or imperfectly 2-)-celled, 4-ovuled; style filiform, stigmatic lobes 2, shortly oblong. *Capsule* globose, 1-celled, normally 4-seeded. *Seeds* glabrous.—Species 7–8, in the warm and temperate regions of both hemispheres.

1. **C. hederacea,** *Wall. Cat.* 1328, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 94; leaves cordate or sagittate entire or lobed, corolla 1 in. subcampanulate pink-purple. *Chois. Convolv. Or.* 103, and in *DC. Prodr.* ix. 434. C. acetosæfolia, *Turcz. Fl. Baic.-Dahur.* 2, ii. 289, *in note.* Convolvulus Wallichianus, *Spreng. Syst. curæ post.* 61. C. acetosæfolius, *Turcz. in Bull. Mosc.* 1840, 73.

NORTH INDIA from the Punjab and Nepal to Penang, exclusive of the Deccan and Ceylon; abundant in the plains of Bengal.—DISTRIB. China, Amurland, Cabul.

Prostrate as a weed of cultivation and climbing 6 ft. in bushes. *Leaves* 1–3 in., very irregular in form; petiole 1 in. *Peduncles* 2 in.; bracts ½ in. ovate. *Sepals* ⅜ in., oblong, obtuse, glabrous. *Capsule* ⅓ in., ovoid, subacute, glabrous.

9. **CONVOLVULUS,** *Linn.*

Herbs or undershrubs, erect prostrate or twining, sometimes spinous. *Leaves* entire, toothed or lobed. *Peduncles* axillary, 1- many-fld.; bracts narrow, rarely wide prominent. *Sepals* subequal, or the outer wider. *Corolla* campanulate, limb 5-plaited, nearly entire. *Stamens* included. *Ovary* 2-celled, 4-ovuled; style filiform; stigmas 2, distinct, oblong or linear. *Capsule* globose, 2-celled, 4-valved, or breaking irregularly, normally 4-seeded. *Seeds* glabrous, usually smooth.—Species 150, tropical and temperate.

* *Erect or diffuse, not twining* (except sometimes *C. glomeratus*), *stigmas filiform, nearly as long as, or longer than the style.*

1. **C. scindicus,** *Stocks in Hook. Kew Journ.* iv. 173, *not of Boiss. Diagn.*; a tomentose, small, rigid, branched undershrub, leaves small spathulate or elliptic plicate, flowers capitate bracteate, sepals lanceolate densely rufous-hirsute, ovary glabrous. *Boiss. Fl. Orient.* iv. 90. C. brachyphyllus, *Boiss. Diagn.* 2, iii. 122.

SCINDE; on rocks, *Stocks.*

Height 1–2-ft.; branches fulvous-tomentose, tips in age subspinescent. *Leaves* ¼–½ in., subentire, very thick, nerves impressed; petiole 0–⅛ in. *Heads* mostly sessile

on shortened branches; outer bracts $\frac{1}{3}$ in., elliptic or ovate, not plicate, densely rusty-tomentose. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., widely funnel-shaped, hairy on the folds without. *Fruit* not seen.

2. **C. Aitchisoni,** *Clarke*; patently fulvous-hirsute, leaves fascicled linear lower oblong, flowers capitate bracteate, sepals linear-lanceolate very hirsute. C. lanuginosus, *Aitch. Cat. Punjab. Pl.* 98; *? of Lamk.*

PUNJAB; Jhelum and Salt Range, *Aitchison.*—DISTRIB. Affghanistan.

Rootstock woody, forming tufts; annual flowering stems $\frac{1}{2}$–4 in. *Radical leaves* $1\frac{1}{2}$ in., linear, or in small examples $\frac{1}{2}$ in. oblong, densely patently hirsute on both sides. *Bracts* $\frac{2}{3}$ in., narrowly lanceolate. *Sepals* $\frac{1}{2}$ in. *Corolla* 1 in., wide-funnel-shaped, hairy on the plaits without. *Ovary* glabrous. *Fruit* not seen.—This cannot be *C. lanuginosus*, Lamk. (Chois. in DC. Prodr. ix. 401), unless *C. Calverti*, Boiss. (Fl. Orient. iv. 94), and several other intermediate species be united with it; it is not silky, but abundantly hirsute with hairs $\frac{1}{6}$ in. long. It is undoubtedly closely allied to *C. lanuginosus*, Lamk. See Cav. Ic. ii. t. 189.

3. **C. microphyllus,** *Sieb.*; *Vis. Pl. Æg.-Nub.* 12; fulvous-villous, leaves linear-oblong or upper elliptic, flowers axillary or on short lateral branches sessile 1–4 together, sepals $\frac{1}{4}$ in. lanceolate densely hirsute, corolla scarcely $\frac{1}{2}$ in. hairy without. *Chois. in DC. Prodr.* ix. 402 (*syn.* C. deserti *excl.*); *Wight Ic.* t. 1367; *Dalz. & Gibs. Bomb. Fl.* 164; *Boiss. Fl. Orient.* iv. 103.

SCINDE; *Stocks.* GOOJERAT; *Dalzell.*—DISTRIB. Beloochistan to Egypt and Nubia.

Rootstock woody; stems 6–24 in., little divided, patently villous, often floriferous from near the base. *Leaves* $\frac{1}{2}$–1 in., silky and villous in Sieber's example, subsessile. *Bracts* lanceolate, rufous-hirsute, shorter than the sepals. *Corolla* wide-funnel-shaped, rose-yellow. *Capsule* scarcely $\frac{1}{5}$ in., ovoid. *Seeds* glabrous.

VAR. *Boissieri*; stems and leaves adpressedly rusty-silky, flowers mostly solitary axillary. C. scindicus, *Boiss. Diagn.* 2, iii. 123, *not of Stocks.*—Scinde; *Stocks, Dalzell.*

4. **C. pluricaulis,** *Chois. Convolv. Or.* 95, and in *DC. Prodr.* ix. 403 (the Plains plant); thinly fulvous-hairy, leaves small linear, flowers 1–3 together axillary pedicelled, sepals $\frac{1}{5}$ in. narrowly linear-lanceolate sparsely hairy, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. hairy without. Evolvulus ferrugineus, *Wall. Cat.* 1316, *the Behar example only.* ? Ipomæa microphylla, *Roth Nov. Sp.* 112.

Plains of HINDOSTAN and BEHAR; *Wallich, H. f. & T.*, &c., frequent.

Rootstock woody; stems 3–6 in., slender, wiry, very thinly hairy. *Leaves* $\frac{1}{2}$ by $\frac{1}{6}$ in., subsessile; radical more spathulate, subpetioled. *Pedicels* 0–$\frac{1}{6}$ in.; bracts linear, small. *Sepals* with a linear elongation, so thinly hairy as to appear glabrous to the naked eye. *Corolla* wide-funnel-shaped, pale rose. *Ovary* glabrous.

VAR. *macra*; larger, more densely hairy, leaves oblong, sepals $\frac{1}{3}$ in. elliptic-lanceolate rufous-hirsute, corolla $\frac{2}{3}$–$\frac{3}{4}$ in., seeds puberulous. Evolvulus pilosus, *Roxb. Fl. Ind.* ii. 106. E. ferrugineus, *Wall. Cat.* 1316.—PUNJAB, common; from 3000 ft. alt. in Kashmir to Delhi; *Wallich, Royle, Edgeworth,* &c.—Easily separable from *C. pluricaulis*, but except in the larger corolla not distinguishable from *C. microphyllus.*

5. **C. rhyniospermus,** *Hochst*; *Chois. in DC. Prodr.* ix. 405; leaves subsessile oblong sparsely hairy, flowers clustered axillary, sepals lanceolate subobtuse hirsute, corolla $\frac{3}{8}$ in. tubular, mouth narrow funnel-shaped. *Wight Ic.* t. 1368.

SCINDE; *Stocks, Dalzell.*—DISTRIB. Cordofan.

Annual; stems 3–10 in., little divided, often flowering nearly their whole length. *Leaves* $\frac{1}{2}$–1 in. *Flowers* rarely solitary, peduncle 0–$\frac{1}{8}$ in.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., and sepals $\frac{1}{4}$ in., not acuminate. *Corolla* hairy without. *Ovary* glabrous. *Capsule* $\frac{1}{4}$ in., ovoid.

Seeds minutely papillose.—There is hardly any difference between the seeds of *C. pluricaulis, rhyniospermus,* and *conglomeratus*; the papillæ on the seeds of *C. rhyniospermus* are thicker, or somewhat scale-like.

6. **C. glomeratus,** *Chois. in DC. Prodr.* ix. 401; leaves subsessile oblong sparsely hairy, heads peduncled bracteate, sepals lanceolate hirsute, corolla ½ in. tubular mouth narrow funnel-shaped. *Wight Ic.* t. 1366; *Boiss. Fl. Orient.* iv. 102.

The PUNJAB, *Vicary*; Scinde, *Stocks,* &c.—DISTRIB. Cabul, Beloochistan to W. Tropical Africa.

Rootstock biennial or perennial; stems 2–3 ft., diffuse, branched, sparsely hairy. *Leaves* ½–1½ in. *Peduncles* ½–3 in.; bracts ½–1 in., leaflike; or the heads sessile on short axillary branches. *Sepals* ⅓ in., lanceolate, acute. *Seeds* puberulous.—Closely allied to *C. rhyniospermus,* but the flowers more numerous (often 6–10) in the head, the habit much more diffuse, running into the following variety.

VAR. *volubilis*; stems distinctly twining, leaves and heads larger, petiole ⅓ in.—Punjab; *Vicary.* Scinde; *Dalzell.*

7. **C. Rottlerianus,** *Chois. Convolv. Or.* 95, and in *DC. Prodr.* ix. 403; silky-villous. leaves sessile linear, peduncles 1–3-fld., sepals ovate suddenly acuminate silky-villous, corolla scarcely ½ in. subcampanulate. *Wight in Madras Journ.* v. 7, t. 13; *Dalz. & Gibs. Bomb. Fl.* 164. Retzia pilosa, *Heyne*; *Wall. Cat.* 6669 (*not* Evolvulus pilosus, *Roxb.*)

W. DECCAN PENINSULA, from Bombay to Madura; *Rottler,* &c.—DISTRIB. Affghanistan.

An erect, branched perennial. *Leaves* 1–2 in. *Peduncles* many, 1½ in.; bracts ⅛ in., linear-lanceolate; pedicel (above the bracts) 0–⅛ in. *Sepals* ¼ in. *Capsule* ⅕ in. ovoid, glabrous. *Seeds* puberulous.

VAR. *tenella,* Stocks in Hook. Kew Journ. iv. 172; sparingly silky not villous, stems strict more slender.—SCINDE; *Stocks.*

** *Stems twining (see also* C. glomeratus); *stigmas narrowly oblong or linear, shorter than the style.*

8. **C. arvensis,** *Linn.*; *Engl. Bot.* t. 312; glabrous or somewhat pubescent, leaves ovate-cordate, auriculate or hastate, peduncles 1–3-fld., bracts small, sepals elliptic obtuse glabrous or nearly so, corolla middle-sized purplish. *Roxb. Hort. Beng.* 14; *Chois. Convolv. Or.* 97, and in *DC. Prodr.* ix. 406; *Dalz. & Gibs. Bomb. Fl.* 163; *Boiss. Fl. Orient.* iv. 108. C. Malcolmii, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 474, and *ed. Carey & Wall.* ii. 55. C. divaricatus, *Wall. Cat.* 1422. C. chinensis, *Ker in Bot. Reg.* t. 322.

WESTERN INDIA, from Kashmir to the Deccan; a weed of cultivation.—DISTRIB. Nearly all temperate and subtropical regions.

Leaves 1–3 in., lower often lobed; petiole ¼–¾ in. *Peduncles* 1–2 in.; bracts ⅛ in., linear; pedicels ⅛–1 in. *Sepals* ¼ in., with or without a mucro. *Corolla* wide-funnel-shaped, glabrous. *Capsule* ¼–⅓ in., glabrous.

9. **C. flavus,** *Willd. Sp. Pl.* i. 852; innovations rusty-pubescent, leaves hastately ovate-oblong angular toothed or lobed, peduncles 1–3-fld., bracts small, sepals elliptic-lanceolate pubescent, corolla small yellowish. *Chois. in DC. Prodr.* ix. 415. C. rufescens, *Chois. Convolv. Or.* 97, and in *DC. Prodr.* ix. 408; *Wight Ic.* t. 1365. Evolvulus hederaceus, *Burm. Fl. Ind.* 77, t. 30, fig. 2.—*Rheede Hort. Mal.* viii. t. 27.

Hills of S. DECCAN PENINSULA, alt. 3–6000 ft., frequent; *Wight,* &c.

Leaves 1–3 in., in age nearly glabrous; petiole 1 in. *Peduncles* 1 in., not rarely paired in the same axil, pubescent; bracts scarcely ⅛ in. *Sepals* ¼–⅓ in.; wider in

fruit. *Corolla* ½ in., hairy at the tip in the bud. *Ovary* and filaments glabrous. *Capsule* ⅓ in., ovoid, 2-celled, irregularly breaking up. *Seeds* glabrous.

10. **C. parviflorus,** *Vahl Symb.* iii. 29; pubescent or nearly glabrous, leaves ovate-cordate acute entire, cymes small dense many-fld. peduncled, corolla ½ in. tubular narrow-mouthed pink or white. *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 51; *Chois. Convolv. Or.* 98, and *in DC. Prodr.* ix. 413; *Dalz. & Gibs. Bomb. Fl.* 163; *Benth. Fl. Austral.* iv. 430. C. asclepiadeus, *Wall. Cat.* 1396. Ipomæa paniculata, *Burm. Fl. Ind.* 50, t. 21, fig. 3. I. parviflora, *Pers. Syn.* i. 183, *not of Vahl.*

ASSAM; *Jenkins.* DECCAN PENINSULA and CEYLON; frequent.—DISTRIB. S.E. Asia, Malaya, Australia, Tropical Africa.

Stems slender. *Leaves* 1½–3 in., shallowly cordate; petiole ½–1 in. *Peduncles* mostly longer than the petioles; cymes subcapitate; bracts inconspicuous. *Sepals* ¼ in., ovate-caudate, pubescent. *Corolla-lobes* short, acute. *Stigmas* short, linear. *Capsule* ⅕ in., globose, glabrous. *Seeds* glabrous.—Much resembling *Jacquemontia cærulea* (cultivated often in India), which has a wider mouthed bright-blue corolla and shorter elliptic-oblong stigmas.

11. **C. microcalyx,** *Clarke*; leaves ovate-cordate acute stellately fulvous-tomentose beneath, cymes compound subsessile, sepals ⅛ in. elliptic obtuse, corolla ½ in.

Cultivated (in the Calcutta gardens?) from Assam?

Stems slender, elongate, villous, twining. *Leaves* 1–1½ in., shallowly cordate, pubescent above; petiole ⅓ in. *Peduncles* very short, or 0, i.e., peduncles several from each axil, fulvous-tomentose; bracts inconspicuous. *Sepals* subscarious, nearly glabrous. *Corolla* of *C. parviflorus*, glabrous. *Ovary* glabrous; style long, stigmas filiform slightly clavate. *Fruit* not seen.—The examples are noted as cultivated; but, if the plant was not brought in from the Assam jungles, it is not known whence it came.

C. glandulosus, Wall. Cat. 2252, and *C. Tarita*, Wall. Cat. 2253, are absent from Wallich's Herbarium.

10. EVOLVULUS, *Linn.*

Small, hairy herbs, or undershrubs. *Leaves* small, entire. *Flowers* small, 1–3 together, peduncled. *Sepals* subequal, unaltered in fruit. *Corolla* funnel-shaped; limb 5-plaited, subentire. *Stamens* included or exserted, filaments filiform. *Ovary* 2–1-celled, 4-ovuled; styles 2, separate from the base, each cleft into 2 linear or subclavate stigmas. *Capsule* globose, 4–2-valved, normally 4-seeded. *Seeds* glabrous; cotyledons doubly folded radicle incumbent. —Species 70, in all hotter climates, more numerous in America.

1. **E. alsinoides,** *Linn.*; *Benth. Fl. Austral.* iv. 437, *with all syn. except* E. pilosus, *Roxb.*; sparsely or densely silky-hairy white fulvous or almost rufous, leaves linear oblong or wide-elliptic, sepals ⅛–⅙ in. lanceolate hairy, corolla ¼–⅓ in. blue or white. *Burm. fl. Zeyl.* 9, t. 6, fig. 1; *Wall. Cat.* 1317; *Roxb. Cat. Pl.* (1813), and *Fl. Ind.* ii. 105; *Chois. in DC. Prodr.* ix. 447; *Wight Ill.* t. 168 bis, fig. 10; *Boiss. Fl. Orient.* iv. 113. E. linifolius, *Linn.*; *Chois. l. c.* 449. E. angustifolius, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 107. E. hirsutus, *Lamk. Enc.* iii. 538, and *Ill.* t. 216, fig. 2; *Chois. l. c.* 447 (*syn. Roxb. excl.*); *Dalz. & Gibs. Bomb. Fl.* 162. E. sericeus, *Wall. Cat.* 1315. Convolvulus valerianoides, *Blanco. Fl. Filip.* 90.—*Rheede Hort. Mal.* xi. t. 64.

Throughout INDIA and CEYLON, very common; rare in very damp regions.—DISTRIB. The tropical and subtropical area of the globe.

Perennial; annual branches numerous, wiry, often prostrate. *Leaves* $\frac{1}{4}$–1 in., rarely $1\frac{1}{2}$ by $\frac{1}{2}$ in., very variable; petiole 0–$\frac{1}{8}$ in. *Peduncles* $\frac{1}{8}$–$1\frac{1}{2}$ in.; bracts small, linear, hairy, persistent; pedicels 0–$\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., globose, 4-valved.—The commonest Indian form is the type with leaves $\frac{1}{4}$–$\frac{1}{2}$ in., oblong or elliptic, moderately silky with white or fulvous hairs. *E. linifolius* (*E. angustifolius*, *Roxb.*), has linear leaves often 1 in. long. *E. hirsutus*, has thick leaves and is more or less densely hirsute with fulvous or rufescent hairs.

11. **PORANA**, *Burm.*

Large climbers. *Leaves* petioled, ovate, entire. *Cymes* often in large panicles; flowers purple steel-blue or white; bracts persistent. *Sepals* in flower small, narrow; in fruit all or 3 much enlarged, scarious, nerved. *Corolla* campanulate or funnel-shaped, wide- or narrow-mouthed; limb 5-plaited, subentire or lobed. *Stamens* subincluded, filaments filiform or shortly linear. *Ovary* 2-celled, 4-ovuled; style long or short, entire with a simple or 2-lobed stigma, or 2-fid with capitate stigmas. *Capsule* globose oblong or obconic, membranous, indehiscent or 2-valved, 1-seeded. *Seed* glabrous; cotyledons plaited.—Species 9, from India to N. Australia.

* *Flowers large, about an inch long.*

1. **P. grandiflora,** *Wall. Cat.* 1324, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 41; shoots minutely pubescent, leaves ovate deeply cordate acuminate, racemes minutely bracted, sepals all much enlarged in fruit, 3 more than the others $1\frac{1}{2}$ by nearly $\frac{1}{2}$ in. obtuse. *Chois. Convolv. Or.* 108, and in *DC. Prodr.* ix. 436; *Kurz in Trimen Journ. Bot.* 1873, 138.

TEMPERATE NEPAL and SIKKIM, alt. 5–8000 ft.; *Wallich, Griffith, J. D. H.*, &c.

An extensive, rather slender, glabrous or pubescent climber. *Leaves* 5 by $2\frac{3}{4}$ in., young villous beneath, old glabrous or puberulous on both surfaces; petiole 3 in. *Peduncles* 3–4 in.; racemes 2–3 in., 4–12-fld.; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{4}$ in. *Sepals* $\frac{1}{8}$ in., linear-oblong, puberulous. *Corolla* mauve; tube $\frac{3}{4}$–1 in., linear; limb funnel-shaped, subentire, $1\frac{3}{4}$ in. diam., glabrous. *Stamens* and pistil $\frac{1}{4}$–$\frac{1}{3}$ in., included in the small swollen base of the corolla-tube. *Style* linear, stigma subglobose. *Capsule* $\frac{1}{2}$ in., subglobose, rather longer than broad; 3 larger fruiting sepals subpalmately 7–9-nerved; 2 smaller, 1 by $\frac{1}{5}$ in.

2. **P. stenoloba**, *Kurz in Trimen Journ. Bot.* 1873, 136; nearly glabrous, leaves ovate slightly cordate caudate-acuminate, racemes long-bracted, sepals all much enlarged in fruit, 3 more than the others 1 by $\frac{1}{8}$ in.

TEMPERATE SIKKIM, alt. 5–6000 ft.; on rocks by the Darjeeling road, not unfrequent, *Kurz.*

Nearly allied to *P. grandiflora*. *Leaves* very shallowly cordate, caudate, glabrous or minutely hairy above. *Bracts* 1–$1\frac{1}{2}$ in., ovate-lanceolate, or lanceolate caudate, often petioled; bracteoles 2, minute. *Corolla* (dry) nearly as of *P. grandiflora*, but "steel-blue," *Kurz & King*. *Capsule* not ripe; 3 larger sepals in fruit membranous, 5-nerved; 2 smaller similar, but $\frac{2}{3}$ less.—This differs from *P. grandiflora* in the shallowly cordate leaves, the remarkable bracts, the colour of the flowers and the exceedingly narrow fruit-sepals; but in Gen. Pl. ii. 876 it is considered conspecific.

3. **P. spectabilis,** *Kurz in Trimen Journ. Bot.* 1873, 136, and *For. Fl.* ii. 221; fulvous-tomentose, leaves subcordate ovate-oblong, racemes subebracteate, 3 sepals greatly enlarged in fruit $1\frac{1}{2}$ by $\frac{1}{3}$ in. 2 altogether suppressed. P. speciosa, *Benth. in Gen. Pl.* ii. 876.

BRITISH BURMA; Martaban, in tropical forests not unfrequent, *Kurz.*

Branches fulvous-tomentose. *Leaves* 4 by $1\frac{3}{4}$ in., base rounded or scarcely cordate, acute or subobtuse not acuminate, puberulous, woolly beneath; petiole $\frac{3}{4}$ in. *Racemes* terminal, subsessile (lowest bract altogether leaflike); pedicels $\frac{1}{4}$ in. *Sepals* in flower $\frac{1}{5}$ in., linear-oblong, fulvous-tomentose. *Corolla* white, hairy without; tube $\frac{2}{3}$ in., narrowly campanulate; mouth funnel-shaped, subentire, $1\frac{1}{4}$ in. diam. *Style* as long as corolla-tube, stigma subcapitate. *Capsule* $\frac{1}{5}$ in. diam. subglobose; fruiting-sepals oblong, subobtuse, scarious, puberulous, subpalmately 7–9-nerved.

** *Flowers small, $\frac{1}{4}$–$\frac{1}{2}$ in. long.*

4. **P. paniculata**, *Roxb. Cor. Pl.* iii. 31, t. 235, and *Fl. Ind.* i. 466, and *ed. Carey & Wall.* ii. 39; densely subtomentose, leaves ovate-cordate acute, cymes subebracteate panicled, 3 sepals greatly enlarged in fruit, the others nearly unchanged. *Don Prodr.* 99; *Wall. Cat.* 1325; *Chois. Convolv. Or.* 107, and in *DC. Prodr.* ix. 436; *Brand. For. Fl.* 342; *Kurz in Trimen Journ. Bot.* 1873, 137, and *For. Fl.* ii. 220. Dinetus paniculatus, *Sweet Hort. Brit.* ed. 2, 373.

Throughout INDIA, in jungles alt. 0–3000 ft. from the W. Himalaya and Assam to CEYLON and Tenasserim; less common in the S. Deccan.—DISTRIB. Ava, Java.

A powerful climber, often 30 ft. high. *Leaves* 5 by 3 in., pubescent above; petiole $1\frac{1}{2}$ in. *Panicles* terminating every branchlet with innumerable flowers. *Sepals* in flower $\frac{1}{12}$ in., linear-oblong. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., campanulate, glabrous, white; limb very shortly lobed. *Filaments* short. *Style* very short, stigma obscurely 2-lobed. *Capsule* $\frac{1}{5}$ in. diam., globose, hairy; 3 enlarged sepals $\frac{3}{4}$ by $\frac{1}{4}$ in. obtuse, pubescent, with one longitudinal and several inarched lateral nerves; 2 others $\frac{1}{4}$ in., linear.—A monstrous form, collected in Sikkim by Sir J. D. H., has fascicled numerous branchlets with very small leaves.

5. **P. volubilis**, *Burm. Fl. Ind.* 51, t. 21, fig. 1; glabrous except the shoots, leaves ovate subcordate shortly acuminate, cymes subebracteate panicled, sepals in fruit all equal $\frac{1}{2}$ in. subspathulate. *Lamk. Ill.* t. 186; *Roxb. Fl. Ind.* i. 465, and *ed. Carey & Wall.* ii. 40; *Blume Bijd.* 723; *Wall. Cat.* 1327; *Don Prodr.* 99; *Wight Ill.* 168 bis, fig. 8, and *Ic. t.* 347; *Chois. Convolv. Or.* 106, and in *DC. Prodr.* ix. 436; *Kurz in Trimen Journ. Bot.* 1873, 137, and *For. Fl.* ii. 220.

MALAY PENINSULA from Pegu to Malacca.—DISTRIB. Burma, Siam, Malaya.

A very large climber; branches glabrous, warted. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base rounded or cordate; petiole $\frac{2}{3}$ in. *Panicles* very large, minutely fulvous-pubescent; pedicels 0–$\frac{1}{4}$ in. *Sepals* in flower $\frac{1}{5}$ in., oblong. *Corolla* $\frac{1}{3}$ in., white; limb distinctly lobed. *Style* bipartite; stigmas small, capitate. *Capsule* $\frac{1}{6}$ in., globose; fruit-sepals with 5–7 longitudinal, not very prominent nerves.—Kurz says this extends to Khasia, and Roxburgh, that it grows in various parts of India; but the only examples seen are Malayan or cultivated.

6. **P. racemosa,** *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 466, and *ed. Carey & Wall.* ii. 41; puberulous or nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{5}$ in. ellipsoid longer than broad, fruiting-sepals equal $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$ in. *Jacq. f. Ecl.* ii. t. 165; *Wall. Cat.* 1326; *Don Prodr.* 98; *Wight Ill.* t. 168 bis, fig. 9, and *Ic.* t. 1376; *Chois. Convolv. Or.* 107, and in *DC. Prodr.* ix. 436; *Dalz. & Gibs. Bomb. Fl.* 162? ; *Kurz in Trimen Journ. Bot.* 1873, 137. Dinetus racemosus, *Sweet Brit. Fl. Gard.* t. 127.

SUBTROPICAL HIMALAYA alt. 2–6000 ft., common; from the North-west (*Royle*) to BHOTAN. KHASIA to MARTABAN; alt. 2–6000 ft., common. DECCAN PENINSULA?

Forming dense, not lofty, masses. *Leaves* 2–3 by $1\frac{1}{2}$ in.; petiole $\frac{3}{4}$ in. *Racemes* lax; bracts at the forks leafy, sessile, scarious in fruit; those at the pedicels $\frac{1}{6}$ in.,

linear. *Sepals* in flower $\frac{1}{8}$ in., linear-oblong, puberulous. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., lobed nearly half-way, white. *Style* linear; stigmas 2, short, oblong. *Capsule* apiculate, glabrous; fruiting sepals oblong-spathulate, with 3–5 strong longitudinal nerves.—The "Snow-creeper" of the English, one of the most beautiful of Indian plants, the masses of dazzling white flowers resembling snow-patches in the jungle. It is doubtful whether this plant is found wild in the Deccan; Wight's figure represents it, but the fruit in his herbarium was sent him from N. India. There is no example from the Deccan, all Dalzell's belong to the next species.

7. **P. malabarica**, *Clarke*; nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{4}$ in. obovoid, fruit-sepals equal attaining 1 by $\frac{1}{2}$ in. elliptic. P. racemosa, *Dalz. & Gibs. Bomb. Fl.* 162.—Porana n. 3, *Herb. Ind. Or. H. F. & T.*

West Deccan Peninsula; Bombay, *Dalzell*; Malabar and Concan, *Stocks*, *Law*; Canara and Mysore, *Law*, &c.

Closely allied to *P. racemosa*. *Fruiting-sepals* sometimes only $\frac{2}{3}$ by $\frac{1}{3}$ in., but always differing widely from the much smaller narrow one of *P. racemosa*.

8. **P. truncata**, *Kurz in Trimen Journ. Bot.* 1873, 136; nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{4}$ in. obconoid truncate, fruiting sepals equal $\frac{2}{3}$ by $\frac{1}{3}$ in.

Khasia Mts., Numklow and Mairung, alt. 4–5000 ft., *Griffith* (Kew Distrib. n. 5876), &c.

Resembles *P. racemosa*, but is stouter and is intermediate between that species and *T. malabarica*. Kurz attempted to distinguish this by the "depressed-concave" summit of the capsule; but the fact is that the fresh capsule usually has a greatly depressed-conical apiculate summit, which in dried specimens often becomes concave. Possibly *P. racemosa*, *P. malabarica*, and *P. truncata*, are varieties of one; but the characters of the capsule and fruit-sepals seem well-marked, and the material is sufficient.

12. BREWERIA, *R. Br.*

Herbs or undershrubs, large and twining, or small and erect. *Leaves* undivided. *Flowers* in axillary peduncled heads or terminal close panicles, or 1–3 together, sessile and axillary; bracts small. *Sepals* equal or unequal, in fruit scarcely altered (in non-Indian species much enlarged). *Corolla* campanulate or funnel-shaped, limb 5-plaited. *Stamens* included; filaments filiform, bases often dilated. *Ovary* 2-celled, 4-ovuled; styles 2, nearly distinct from the base or united half their length, stigmas capitate. *Capsule* globose or ovoid, normally 4-seeded.—Species 23, in the tropics of both hemispheres, Australia and N. America.

* *Twiners; flowers medium-large yellowish in peduncled cymes; styles united about half their length.*

1. **B. cordata,** *Blume Bijd.* 722; rusty-villous, leaves ovate-cordate acute. *Chois. in DC. Prodr.* ix. 438. B. Roxburghii, *Chois. Convolv. Or.* 111, and in *DC. Prodr.* ix. 438; *Wight Ic.* t. 1370; *Dalz. & Gibs. Bomb. Fl.* 162. Convolvulus semidigynus, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 468, and *ed. Carey & Wall.* ii. 47; *Wall. Cat.* 1405.

West Deccan Peninsula; from the Concan Ghauts southwards; East Bengal, and the Malay Peninsula, from Silhet to Malacca, frequent. Ceylon, frequent. Distrib. Malaya.

A powerful twiner; branches villous. *Leaves* 4 by $2\frac{1}{2}$ in., those on the flowering branchlets ovate-cordate; petiole $1\frac{1}{2}$ in. *Peduncles* about as long as the petioles, 2–5-fld.; bracts $\frac{1}{4}$ in., oblong; cymes subcapitate, rusty-villous. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in., ovate-oblong, subacute, subequal. *Corolla* $1\frac{1}{2}$ in., wide-funnel-shaped, hairy without; limb subentire. *Style* $\frac{2}{3}$ in., united for $\frac{1}{3}$ in. *Capsule* $\frac{1}{2}$ in., subglobose, glabrous, splitting into numerous vertical segments; sepals in fruit somewhat enlarged, ovate, hardly so long as the capsule. *Seeds* about as broad as long, nearly glabrous.

2. **B. elegans,** *Chois. Convolv. Or.* 112, and in *DC. Prodr.* ix. 439; fulvous-villous, leaves elliptic those of the flowering branches oblong or sublinear none cordate. Convolvulus elegans, *Wall. Cat.* 1392.

BRITISH BURMA; Prome, *Wallich.*

Very near *B. cordata*, differing chiefly in the leaves. *Leaves* of the flowering shoots (for 18 in. near their tops) $1\frac{1}{2}$ by $\frac{1}{3}$ in., narrow-oblong, mucronate; lower leaves 3 by $1\frac{1}{4}$ in., obtuse, almost rounded at both ends. *Pedicels* $\frac{1}{4}$–$\frac{1}{3}$ in., rather longer than in *B. Roxburghii.* *Corolla* as of *B. Roxburghii* but the tube appears more cylindric, less funnel-shaped. *Capsule* not seen.—Material rather scanty for the support of so critical a species.

** *Small, erect; leaves small; flowers small, axillary,* 1–3 *together white or pinkish; styles distinct very nearly to the base.*

3. **B. evolvuloides,** *Chois. Convolv. Or.* 112, and in *DC. Prodr.* ix. 439; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. oblong or elliptic nearly glabrous, pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., capsule $\frac{1}{10}$–$\frac{1}{8}$ in. Seddera evolvuloides, *Wight Ic.* t. 1369. Evolvulus alsinoides, *Wall. Cat.* 1317, *by admixture.*

DECCAN PENINSULA; *Heyne*; near Tuticorin, *Wight.*

A very branched, rigid, harsh, small shrub; with a few scattered strigose hairs. *Sepals* $\frac{1}{8}$ in., oblong, nearly glabrous, suberect both in flower and fruit. *Corolla* $\frac{1}{4}$ in. *Capsule* subglobose, shortly pointed, glabrous tipped with a tuft of hairs 4-valved. *Seeds* glabrous.

4. **B. latifolia,** *Benth. in Gen. Pl.* ii. 877; leaves $\frac{1}{4}$–$\frac{3}{4}$ in. elliptic densely silky, flowers sessile, capsule $\frac{1}{5}$ in. Seddera latifolia, *Hochst. & Steud. in Flora,* 1844, *Beibl.* 8, t. 5, fig. B.C.; *Chois. in DC. Prodr.* ix. 440; *Boiss. Fl. Orient.* iv. 114. Cressa latifolia, *T. And. in Journ. Linn. Soc.* v. *Suppl.* 25, *excluding the Deccan synonyms.*

PUNJAB and SCINDE; *Vicary, Stocks,* &c.—DISTRIB. W. Tropical Asia, E. Tropical Africa.

Dr. T. Anderson thought this plant not specifically separated from the Deccan *B. evolvuloides* by its hairiness and sessile flowers; but the capsule is twice as large, ovoid, and the seeds ovoid-oblong, twice as long as broad. *Sepals* acuminate, densely silky.

13. NEUROPELTIS, *Wall.*

A large scandent shrub; shoots rufous-villous or tomentose. *Leaves* alternate, petioled, coriaceous, ovate or oblong. *Racemes* axillary, or subpanicled towards the ends of the branches; flowers numerous, small, pedicelled; bract under the calyx inconspicuous in flower, in fruit enlarged 1 in. or more diam. *Sepals* suborbicular, in fruit hardly enlarged. *Corolla* wide-campanulate, deeply lobed, lobes induplicate-valvate in bud. *Stamens* exserted or included, filaments filiform. *Ovary* imperfectly 2-celled, 4-ovuled; styles 2, separate from the base, shortly linear, stigmas subcapitate or obscurely 2-lobed. *Capsule* globose, 4-valved, 1-seeded, sessile in the middle of the flat bract. *Seed* globose, glabrous, albuminous; cotyledons plaited.—Species 2, the following and an African.

1. **N. racemosa,** *Wall. Cat.* 1322, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 44; leaves elliptic or oblong acute or shortly acuminate, racemes 1–6 in. rusty-villous or tomentose dense. *Deless. Ic. Sel.* v. t. 96; *Chois. Convolv. Or.* 109, t. 2, fig. 12, and in *DC. Prodr.* ix. 437; *Bedd. Ic. Pl. Ind. Or.* t. 291; *Kurz For. Fl.* ii. 222. N. ovata, *Wall. Cat.* 1323; *Chois. Convolv. Or.* 110, t. 2, fig. 13, and in *DC. Prodr.* ix. 437. N. bracteata and intermedia, *Griff. Notul.* iv. 285.

MALAY PENINSULA, from Mergui southwards; *Wallich, Griffith, Maingay,* &c. MALABAR PLAINS, near Tambacherry Ghat, *Beddome.*—DISTRIB. Borneo.

Leaves 5 by 2½ in., base obtuse or rhomboid, when young more or less rusty-villous, sometimes on both surfaces, adult glabrous or nearly so, feather-nerved; petiole ½–1 in. *Racemes* subsessile, i.e. flowerbearing nearly to the base; pedicels in flower ⅛ in.; bract minute. *Sepals* ⅛ in. *Corolla* ¼–⅓ in., widely campanulate, rufous-villous without. *Ovary* hairy. *Bract* in fruit 1–1¾ in. diam., orbicular, base rounded or cordate, scariose, nerved. *Capsule* ¼ in., ovoid, glabrescent.

14. CRESSA.

A very small shrub, erect or diffuse, grey-pubescent. *Leaves* small, sessile, elliptic, acute. *Flowers* small, sessile in the upper axils, often in terminal clusters or spikes. *Sepals* equal, not enlarged in fruit. *Corolla* small, funnel-shaped, white or rose; lobes 5, subimbricated (not plaited) in bud. *Stamens* exserted, filaments filiform. *Ovary* sub-2-celled, 4-ovuled; styles 2, distinct, linear, stigmas capitate. *Capsule* 2–4-valved, usually 1-seeded. *Seed* glabrous; cotyledons linear, plicate.

1. **C. cretica**, *Linn.*; *Lamk. Ill.* t. 183; *Sibth. Fl. Græc.* t. 256; *Chois. in DC. Prodr.* ix. 440; *Dalz. & Gibs. Bomb. Fl.* 162; *Boiss. Fl. Orient.* iv. 114. C. indica, *Retz. Obs.* iv. 24; *Roxb. Cat. Pl.* (1813), and *Fl. Ind. ed. Carey & Wall.* ii. 72; *Wall. Cat.* 2260; *Chois. Convolv. Or.* 113. C. australis, *Br. Prodr.* 490.

Throughout INDIA from the Punjab and Calcutta to CEYLON, not common.—DISTRIB. All warm regions.

Stem 6–18 in. *Leaves* ¼–⅓ in. *Sepals* ⅛ in. *Corolla* ⅙ in.; lobes reflexed. *Capsule* ⅛ in.—The Indian plant differs from the common form of *C. cretica* in having 4 (not 1) seeds, according to Retz and Roxburgh.

15. CUSCUTA, *Linn.*

Leafless twining parasites, yellow or reddish not green. *Flowers* small, white or rose, fascicled, sessile or shortly pedicelled; bracts 0 or small. *Sepals* 5–4, subequal, distinct or shortly connate. *Corolla* ovoid or campanulate; lobes 5–4, short, imbricate in bud. *Stamens* 5–4, inserted near the throat of the corolla-tube, filaments short linear; anthers oblong, shortly exsert; scales near the base of the filaments or at the base of the corolla, often fimbriate, rarely 0. *Ovary* completely or incompletely 2-celled, 4-ovuled; styles 1 or 2, stigmas 2. *Capsule* globose or ovoid, dry or succulent, circumsciss or irregularly breaking up, 4–2-seeded. *Seeds* glabrous, albumen fleshy; embryo slender, twisted, cotyledons 0 or obscure.—Species 80, in warm and temperate regions.

SUBGENUS 1. **Monogynella.** *Ovary*, and young fruit, narrowed upwards into a single short style with 2 long stigmas.

1. **C. reflexa**, *Roxb. Cor. Pl.* ii. 3, t. 104, and *Fl. Ind.* i. 446, and *ed. Carey & Wall.* i. 466; flowers subracemose, bracts small fleshy subquadrate,

corolla campanulate deciduous, scales remote from the filaments, style very short, stigmas lanceolate, capsule $\frac{1}{4}$–$\frac{1}{3}$ in. fleshy circumsciss near the base 4-seeded. *Wall. Cat.* 1319; *Hook. Exot. Fl.* t. 150; *Chois. Convolv. Or.* 116, and in *DC. Prodr.* ix. 454; *Engelm. Cusc.* 68. C. grandiflora, *Wall. Cat.* 1318. *Chois. Convolv. Or.* 116. C. verrucosa, *Sweet Brit. Fl. Gard.* t. 6. C. Hookeri, *Sweet Hort. Brit.* ed. 2, 373. C. macrantha, *G. Don Gen. Syst.* iv. 305; *Chois. in DC. Prodr.* ix. 455. C. elatior, *Chois. Convolv. Or.* 177.

Throughout INDIA, alt. 0–8000 ft., common; Bengal Plain, abundant. CEYLON; Newera Ellia, *Gardener.*—DISTRIB. Malaya.

Branches stout, fleshy, forming dense yellow masses on low trees and shrubs. *Flowers* 5-merous, in lax racemes 1–4 in. long, also clustered or subspicate; pedicels 0–$\frac{1}{4}$ in., often verrucose; bracts $\frac{1}{20}$ in. *Sepals* $\frac{1}{10}$ in., nearly distinct, ovate, obtuse. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{6}$ in., subcylindric; lobes short-triangular, reflexed; scales prominent, emarginate, fimbriate. *Stigmas* wide apart. *Capsule* (unripe) acute (corolla early deciduous), ultimately subquadrate obtuse tough fleshy. *Seeds* large, black.

3045 VAR. *anguina*, corolla about half the usual size. C. anguina, Edgew. in Trans. Linn. Soc. xx. 87.—W. Himalaya; *Edgeworth.* The corolla varies a good deal in size from Wallich's *C. grandiflora* down to *C. anguina*, Edgw.; the chain of intermediates is nearly complete.

2. **C. gigantea**, *Griff. Notul.* i. 243; spikes short subracemose, corolla cylindric deciduous, scales near its base remote from the filaments, style short, stigmas lingulate, capsule $\frac{1}{6}$–$\frac{1}{5}$ in. membranous circumsciss near the base 2-seeded. *Engelm. Cuscut.* 66; *Boiss. Fl. Orient.* iv. 122.

WESTERN TIBET; *Falconer.*—DISTRIB. Cabul.

Much slenderer than *C. reflexa*. *Flowers* irregularly fascicled or shortly pedicelled, not capitate; bracts $\frac{1}{24}$ in., ovate. *Sepals* $\frac{1}{16}$ in., ovate, obtuse. *Corolla* $\frac{1}{6}$–$\frac{1}{5}$ in., tube subcylindric; lobes 5, subacute, erect or reflexed; scales elliptic, shortly fimbriate. *Pistil* nearly as of *C. reflexa* but smaller. *Capsule* ultimately subquadrate, obtuse. *Seeds* broadly rhombiform, black.—Founded on n. 683 of *Griff. Herb. Propr.* from Cabul; but the Kew Distrib. n. 5899, which also bears Griffith's ticket n. 683, is a *Eucuscuta* with subglobose corolla and two styles, &c.

SUBGENUS 2. **Eucuscuta**. *Ovary* and young fruit obtuse. *Styles* 2, their bases approximate but separated by a narrow depression which in the fruit becomes a pit.

* *Styles elongate, stigmas capitate.*

3. **C. hyalina**, *Roth Nov. Sp.* 100, *not of Wight*; cymes or racemes dense, calyx acutely lobed $\frac{2}{3}$ down, corolla-lobes lanceolate acuminate, scales 0. *Engelm. Cuscut.* 40; *Boiss. Fl. Orient.* iv. 121. C. sulcata, *Wall. Cat.* 1320 (as to Heyne's examples marked *C. hyalina*). C. arabica, *Wight Ic.* 1371, *not of Fresen.* C. oxypetala, *Boiss. Diagn.* 2. iii. 130. C. Boissieri, *Stocks in Hook. Kew Journ.* iv. 173.

SCINDE; *Stocks.* DECCAN PENINSULA, *Rottler*; Palamcottah, *Wight.*—DISTRIB. Beloochistan; Abyssinia.

Pedicels 0–$\frac{1}{8}$ in.; bracts $\frac{1}{24}$ in., ovate. *Calyx* $\frac{1}{8}$ in. *Corolla-tube* $\frac{1}{12}$–$\frac{1}{10}$ in.; lobes 5, $\frac{1}{8}$ in., acuminate and even caudate. *Capsule* $\frac{1}{10}$ in., fragile, irregularly breaking up from the base, normally 4-seeded.—A strongly marked plant, certainly *C. hyalina* of Rottler, Engelmann and Boissier; but the description of Roth, copied by Choisy (in *DC. Prodr.* ix. 460), is greatly at variance with the characters of the plant.

4. **C. chinensis**, *Lamk. Enc.* ii. 229; cymes or racemes dense, sepals triangular-ovate subobtuse, corolla-lobes ovate obtuse or shortly acute, scales shortly fimbriate. *Chois. in DC. Prodr.* ix. 457; *Wight. Ic.* t. 1373; *Engelm.*

Cuscut. 29; *Boiss. Fl. Orient.* iv. 120. C. carinata, *Br. Prodr.* 491; *Chois. l. c.* 460. C. sulcata, *Roxb. Fl. Ind.* i. 447; *Wall. Cat.* 1320, *type sheet.* C. capillaris, *Wall. Cat.* 1321; *Chois. Convolv. Or.* 117. C. hyalina, *Wight Ic.* t. 1372, *not of Roth.* C. ciliaris, *Hohenack*; *Boiss. Diagn.* 2. iii. 129. Grammica aphylla, *Lour. Fl. Cochinch.* 171.

KASHMIR and CHUMBA; alt. 5–7000 ft., *Clarke.* E. BENGAL; *Wallich.* DECCAN PENINSULA; common. CEYLON; at Colombo.—DISTRIB. Eastwards to Australia and Westwards to Persia.

Resembling *C. hyalina*, but with much less elongate acute corolla-lobes. *Sepals* nearly free, in large examples keeled (*C. sulcata*, Roxb. or *C. carinata*, R. Br.); in small examples flat.

VAR. *minor*, Chois. 3rd Mem. Convolv. t. 3, fig. 4; calyx and corolla hardly half so large as in the type. C. sulcata, *Wall. Cat.* 1320, n. 3.—Martaban; *Wallich.*—Stems exceedingly slender. Referred in MS. by Engelmann to *C. obtusiflora*, H.B.K. Var. breviflora; but the Martaban plant has the calyx divided to the base, and seems merely a weak example of *C. chinensis*, as Wallich regarded it. Engelmann (Cuscut. 43) also refers as a Var. of *C. obtusiflora*, H. B. K., a plant collected in Kashmir by Jacquemont n. 876, which is no doubt this.

** *Stigmas elongate or linear often as long as the styles.*

5. **C. capitata,** *Roxb. Fl. Ind.* i. 448; flowers capitate, corolla ovoid covered with minute papillæ without. *Engelm. Cuscut.* 23.

TEMPERATE W. HIMALAYA, alt. 6–12,000 ft., from Kashmir to Simla; *Jacquemont, Thomson*, &c.—DISTRIB. Cabul.

A slender rose-coloured species. *Sepals* $\frac{1}{20}$–$\frac{1}{16}$ in., ovate. *Corolla* scarcely $\frac{1}{8}$ in., mouth contracted; lobes 5, small, triangular, suberect; scales small, low in the corolla, slightly fimbriate. *Styles* linear-lanceolate, as long as the short-linear stigmas. *Capsule* $\frac{1}{12}$ in., exceedingly thin and fragile, enclosed by the unchanged corolla, irregularly breaking up from the base. *Seeds* 4, ellipsoid, brown.—An unmistakable species; and, as Engelmann noticed, agrees well with Roxburgh's figure and description: the puzzle is whence Roxburgh got it; he says it grew abundantly on *Crotalaria juncea*, a plant cultivated at or near the sea-level.

6. **C. europæa,** *Linn.*; *Syme Engl. Bot.* t. 927; flowers in sessile globose heads, calyx-tube shortly obconic lobes 5–4 ovate-triangular, styles shorter than the linear stigmas, capsule circumsciss near the base along a thickened rim. *Engelm. Cuscut.* 18, 19, *with syn.*; *Boiss. Fl. Orient.* iv. 117. C. major, *C. Bauh.*; *Chois. in DC. Prodr.* ix. 452. C. aggregata, *Roxb. Fl. Ind.* i. 447. C. capillaris, *Edgew. in Trans. Linn. Soc.* xx. 86.

TEMPERATE HIMALAYA, alt. 5–12,000 ft., from Kashmir to Sikkim; *Thomson Edgeworth, J. D. H.*, &c.—DISTRIB. Europe, Western and Central Asia.

Calyx $\frac{1}{12}$ in. *Corolla-tube* $\frac{1}{12}$ in., ovoid; lobes 5–4, ovate or triangular; scales near the base of the filaments, obtuse or emarginate, crenulate or subentire. *Capsule* $\frac{1}{12}$ in., fragile. *Seeds* usually 4, ellipsoid, brown.

7. **C. planiflora,** *Tenore*; *Engelm. Cuscut.* 14 *with syn.*; flowers in sessile globose heads, sepals ovate-oblong, corolla-tube longer than the calyx, styles shorter than the linear stigmas, capsule circumsciss near the base along a thickened rim. *Boiss. Fl. Orient.* iv. 116. C. minor, *C. Bauh.*; *Chois. in DC. Prodr.* ix. 453. C. brevistyla, *A. Rich. Fl. Abyss.* ii. 79; *Engelm. Cuscut.* 17; *Boiss. Fl. Orient.* iv. 117.

SUBTROPICAL W. HIMALAYA, alt. 1–6000 ft.; frequent, descending to the Punjab Plain.—DISTRIB. Mediterranean Region, Central Asia.

Closely resembling *C. europæa.* *Calyx* and *corolla* often glistening from their large lax tissue; whence the Indian examples have been regarded as papillose, and placed wrongly with *C. capitata.* *Corolla-tube* usually much longer than the calyx.

Seeds more fimbriate than in *C. europæa*. *Styles* (in Engelmann's named examples of *C. planiflora*) short, less than half as long as the stigmas. *C. brevistyla* is not merely "too near" *C. planiflora* as both Engelmann and Boissier suggest; it is the same thing.

ORDER CII. **SOLANACEÆ.** (By C. B. Clarke.)

Herbs or shrubs. *Leaves* alternate, often in unequal pairs, rarely clustered, never opposite; entire, lobed or pinnate; stipules 0. *Cymes* lateral, or terminal, axillary or extra-axillary, or pedicels solitary or clustered; bracts and bracteoles 0. *Flowers* regular, hermaphrodite (in *Withania coagulans* diœcious). *Calyx* inferior, 5-, rarely 3–7-merous, in *Nicandra* 5-partite; in fruit usually persistent, often much enlarged. *Corolla* funnel-shaped campanulate, or rotate, often plaited; lobes 5 (in *Datura* sometimes 10), or limb subentire. *Stamens* 5, on the corolla-tube; anthers ovate or oblong, dehiscing by apical pores or longitudinally. *Ovary* 2-celled, or imperfectly 1- or 4-celled, in *Nicandra* 3–5-celled; style linear, stigma capitate or very shortly lobed; ovules very many, on prominent peltate placentas. *Fruit* baccate or capsular, indehiscent circumsciss or valvular, usually 2-celled, many-seeded. *Seeds* compressed, discoid or subreniform, embryo peripheric; or (in *Nicotiana*) seeds scarcely compressed, embryo straight.—Species 1250 in the warmer parts of the whole world.

SUBORDER I. **Solaneæ.** *Corolla-limb* plaited or the lobes valvate. *Fruit* a berry. *Seeds* much compressed, subdiscoid; embryo peripheric.

* *Anthers opening by 2 pores at the apex.*

Leaves entire, lobed or pinnatifid . . . . 1. SOLANUM.
Leaves pinnate . . . . 1*. LYCOPERSICUM.

** *Anthers oblong, dehiscing longitudinally.*

† *Calyx in fruit small.*

Flowers small. Pedicels solitary or paired . . . . 2*. CAPSICUM.

†† *Calyx in fruit enlarged, overtopping the berry.*

Pedicels solitary. Calyx shortly lobed . . . . 2. PHYSALIS.
Flowers clustered, sessile or nearly so . . . . 3. WITHANIA.
Pedicels solitary. Calyx 5-partite . . . . 3*. NICANDRA.

SUBORDER II. **Atropeæ.** *Corolla-lobes* more or less imbricate. *Fruit* a berry. *Seeds* compressed; embryo peripheric.

Pedicels solitary or few together. Calyx and corolla small . . 4. LYCIUM.
Pedicels solitary. Calyx foliaceous . . . . 5. ATROPA.
Pedicels clustered, subradical . . . . 6. MANDRAGORA.

SUBORDER III. **Hyoscyameæ.** *Corolla-lobes* plaited or imbricate. *Fruit* capsular. *Seeds* somewhat compressed; embryo peripheric.

* *Capsule 4-celled, 4-valved, or subindehiscent.*

Flowers solitary. Calyx circumsciss . . . . 7. DATURA.

** *Capsule circumsciss.*

Pedicels solitary, distant . . . . 8. SCOPOLIA.
Corymb terminal, peduncled . . . . 9. PHYSOCHLAINA.
Flowers unilateral, upper racemose . . . . 10. HYOSCYAMUS.

SUBORDER IV. **Cestrineæ.** *Corolla-lobes* induplicate-valvate. *Fruit* capsular. *Seeds* scarcely compressed; embryo straight.

Flowers panicled . . . . 10*. NICOTIANA.

1. SOLANUM, *Linn.*

Shrubs herbs or small trees, spinous or unarmed. *Leaves* alternate or subopposite in equal pairs, entire lobed or pinnatifid. *Cymes* dichotomous or racemose, lateral or terminal. *Calyx* 5- or 10-lobed, rarely 4-lobed, or subentire, unaltered or enlarged in fruit. *Corolla-tube* short, rotate, rarely campanulate; limb 5- (rarely 4–6-) lobed, plaited in bud. *Stamens* 5 (rarely 4–6) in the corolla-throat, filaments short; anthers oblong, narrowed upwards, connivent into a cone, opening by terminal pores or short slits. *Ovary* 2-celled, rarely (in cultivated forms) 3–4-celled; style columnar, stigma small. *Berry* small or large, globose or elongate. *Seeds* very many, discoid; embryo peripheric.—Species 700, chiefly in the hotter parts of the globe, most numerous in America.

S. tuberosum, Linn. (the Potato) is extensively cultivated in India, from the sea-level up to nearly 8000 feet.

* Unarmed. Sepals not overtopping the berry.

† *Cymes or racemes peduncled; calyx-teeth* 5 (*rarely* 4 *or* 6).

1. **S. nigrum**, *Linn.*; glabrous or sparingly pubescent, leaves ovate or oblong sinuate toothed or lobed, peduncles extra-axillary, pedicels subumbelled, calyx-teeth small obtuse, corolla white. *Blume Bijd.* 694; *Wall. Cat.* 2615; *Dunal in DC. Prodr.* xiii. 150; *Benth. Fl. Austral.* iv. 446 *with syn.*; *Kurz For. Fl.* ii. 224. S. rubrum, *Miller*; *Roxb. Fl. Ind.* i. 565; *Nees in Trans. Linn. Soc.* xvii. 39; *Dunal l. c.* 57. S. triangulare, *Lamk. Ill.* ii. 18; *Dunal l. c.* 53. S. villosum, *Lamk. Ill.* ii. 18; *Dunal l. c.* 58; *Boiss. Fl. Orient.* iv. 284. S. incertum, *Dunal Sol.* 155, and in *DC. l. c.* 57; *Nees l. c.* 38. S. nodiflorum, *Jacq. Ic. Rar.* ii. t. 326; *Dunal in DC. l. c.* 46. S. uliginosum and rhinocerotis, *Blume Bijd.* 695; *Dunal in DC. l. c.* 50. S. Roxburghii, *Dunal l. c.* 57; *Wight Ic.* t. 344. S. fistulosum, *Rich.*; *Nees l. c.* 37; *Dunal l. c.* 49. S. miniatum, *Bernh.*; *Dunal l. c.* 56; *Boiss. l. c.* S. paludosum, pterocaulon, suffruticosum, Rumphii and erythræum, *Dunal l. c.* 57, 52, 53, 57 and 371, *with many others.*—*Rheede Hort. Mal.* x. t. 73; *Rumph. Herb. Amb.* vi. t. 26, fig. 2.

Throughout INDIA and CEYLON, alt. 0–7000 ft.; common.—DISTRIB. All temperate and tropical parts of the world.

Herbaceous or suffrutescent. *Leaves* 3½ by 2 in., narrowed at both ends; petiole ¾ in. *Peduncles* ¼–¾ in.; pedicels 5–8, ⅓ in. *Sepals* $\frac{1}{20}$ in., ovate-oblong; in fruit often obscure, the calyx saucer-shaped. *Corolla* ½ in. diam., nearly glabrous. *Ovary* glabrous, style-base hairy. *Berry* ¼ in. diam., globose, red or black, sometimes yellow. *Seeds* $\frac{1}{25}$ in. diam., smooth or nearly so.

2. **S. dulcamara**, *Linn.*; *Boiss. Fl. Orient.* iv. 285; glabrous or sparingly pubescent, leaves ovate or oblong subentire lobed or lyrate, peduncles extra-axillary, cymes laxly panicled, calyx-teeth small obtuse, corolla purple. *Dunal in DC. Prodr.* xiii. pt. i. 78; *Bentl. & Trim. Med. Pl.* 190. S. lyratum, *Thunb. Fl. Jap.* 92; *Dunal l. c.* 79. S. persicum, *Willd. ms.*; *Dunal l. c.* 79. S. laxum, *Royle Ill.* 279 (*name only*).

TEMPERATE W. HIMALAYA, alt. 4–8000 ft., from Kashmir to Gurwhal, frequent. SIKKIM, Choongtam, *J. D. H.*—DISTRIB. Europe, W. and Central Asia, China, Japan.

A shrub. *Leaves* 3–5 in., in the Indian examples often cordate-oblong, acute, entire lobed or almost pinnate; petiole 1 in. *Peduncles* $\frac{1}{4}$–4 in.; cymes 2–5 in. diam.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Calyx* in fruit almost saucer-shaped, lobes in flower $\frac{1}{20}$ in., ovate-oblong. *Corolla* $\frac{3}{8}$ in. diam. *Style* glabrous. *Berry* $\frac{1}{4}$ in. diam., globose. *Seeds* $\frac{1}{16}$ in. diam., smooth.—*S. laxum*, Royle, is a starved state with the panicle almost capillary and flowers about $\frac{1}{8}$ in. diam.

3. **S. spirale,** *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 566; glabrous, leaves elliptic entire acute at both ends, peduncles extra-axillary, pedicels long densely spirally racemed, calyx-teeth minute, corolla white. *Wall. Cat.* 2619; *Nees in Trans. Linn. Soc.* xvii. 40; *Dunal in DC. Prodr.* xiii. pt. i. 146; *Kurz For. Fl.* ii. 227.

ASSAM, KHASIA MTS. and EAST BENGAL; alt. 0–3500 ft., in and near the hills, common.—DISTRIB. Ava.

A herb or undershrub 4–12 feet, resembling a large *S. nigrum.* *Leaves* attaining 8 by 3 in., attenuate at the base, glabrous or scarcely puberulous; petiole $\frac{2}{3}$ in. *Pedicels* numerous, $\frac{1}{2}$–1 in.; racemes sometimes divided. *Calyx* $\frac{1}{8}$ in., cup-shaped; in fruit saucer-shaped, not enlarged. *Corolla* $\frac{3}{8}$ in. diam., deeply lobed. *Anthers* oblong, scarcely narrowed upwards. *Berry* $\frac{1}{3}$ in. diam., globose, smooth. *Seeds* $\frac{1}{8}$ in. diam., smooth.

4. **S. vagum,** *Heyne in Wall. Cat.* 2624; leaves elliptic acute at both ends sinuate glabrescent, peduncles extra-axillary, pedicels long sub-racemed, calyx-teeth linear-lanceolate. *Nees in Trans. Linn. Soc.* xvii. 48; *Dunal in DC. Prodr.* xiii. pt. i. 116.

DECCAN PENINSULA; *Heyne.*

A glabrescent shrub, shoots stellately white-pubescent. *Leaves* 6 by 2$\frac{1}{4}$ in., very shallowly lobed; petiole 1$\frac{1}{2}$ in. *Peduncles* $\frac{3}{4}$ in.; racemes dense, sometimes divided; pedicels $\frac{1}{4}$–1 in., spirally placed. *Calyx-teeth* in flower $\frac{1}{6}$ in.; in fruit $\frac{1}{5}$ in. *Corolla* $\frac{2}{3}$ in. diam., deeply lobed, sparingly pubescent without. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., globose, smooth.—Very closely allied to *S. spirale.*

5. **S. verbascifolium,** *Linn.*; *Dunal in DC. Prodr.* xiii. pt. i. 114; stellately woolly, leaves elliptic acuminate entire, corymbs peduncled sub-terminal compound dense, calyx-teeth triangular, corolla white. *Jacq. Hort. Vind.* i. t. 13; *Lour. Fl. Cochinch.* 128; *Wall. Cat.* 2616; *Nees in Trans. Linn. Soc.* xvii. 46; *Wight Ic.* t. 1398; *Dalz. & Gibs. Bomb. Fl.* 175; *Kurz For. Fl.* ii. 225. S. pubescens, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 244; *Blume Bijd.* 698, *not of Willd.* S. erianthum, *Don Prodr.* 96.

Throughout INDIA, in the Tropical and Subtropical zone; common.—DISTRIB. S.E. Asia, Malaya, N. Australia, Tropical America.

A shrub, or subarboreous, 20 feet high. *Leaves* 7 by 3 in. attenuate at both ends or base subrhomboid; petiole 1–2 in. *Peduncles* stout, 1–4 in.; cymes dichotomously compound, very woolly. *Calyx-lobes* in flower $\frac{1}{12}$ in., thrice as large in fruit, but much shorter than the berry. *Corolla* $\frac{3}{4}$ in. diam., woolly without. *Ovary* hairy, style glabrous. *Berry* $\frac{1}{3}$ in. diam., globose, yellow. *Seeds* $\frac{1}{8}$ in. diam., nearly smooth.

6. **S. pubescens,** *Willd. Phyt.* 5, t. 3; leaves ovate entire sinuate thinly stellately hairy, racemes lateral and terminal 3–10-flowered, calyx-teeth lanceolate, corolla purple. *Wall. Cat.* 2629; *Nees in Trans. Linn. Soc.* xvii. 60; *Dunal in DC. Prodr.* xiii. pt. i. 127; *Wight Ic.* t. 1402. S. calycinum, *Nees l. c.* S. conanthum, *Dunal l. c.*

DECCAN PENINSULA and CEYLON; *Wight, Thwaites,* &c.

A shrub or subarboreous; young branches densely stellately woolly, older usually perfectly glabrous. *Leaves* 2–4 in., irregularly obscurely lobed, base rhomboid or shallowly cordate shortly decurrent, young stellately subwoolly, mature thinly hairy

or glabrescent. *Racemes* densely woolly, or villous; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{5}$ in. in flower, in fruit $\frac{1}{4}$ in. *Corolla* $\frac{3}{4}$–$1\frac{1}{4}$ in. diam., closely tomentose without. *Anther* of the lowest stamen produced upwards, longer than the others. *Berry* $\frac{1}{2}$ in. diam., globose, smooth. *Seeds* $\frac{1}{8}$ in. diam. and upwards.

Var. ? *lobata*; leaves lobed very tomentose beneath, flowers smaller.—Khasia Hills.—This example (from Herb. Calcutta, named *S. pubescens* by Kurz) has no fruit, nor prickles. It resembles the unarmed form of *S. Melongena*, but the flowers are too small.

†† *Pedicels axillary, clustered or solitary, or in a subsessile umbel; calyx-teeth* 5–10 *or obsolete; corolla glabrous without or nearly so.*

7. **S. subtruncatum,** *Wall. Cat.* 2620; leaves lanceolate acuminate at both ends entire glabrous or nearly so, flowering calyx cup-shaped entire or obscurely toothed fruiting saucer-shaped entire, corolla $\frac{1}{4}$ in. long. *Dunal in DC. Prodr.* xiii. pt. i. 180. S. denticulatum, *Nees in Trans. Linn. Soc.* xvii. 41, *not of Blume.* S. Neesianum, *Wall.*; *Nees l. c.* 42, *not of Wight nor of Dalz.*

Khasia Mts. alt. 3–5000 ft., common; *Wallich, Griffith,* &c. Assam; *Jenkins.*

A shrub, nearly glabrous. *Leaves* $6\frac{1}{2}$ by $1\frac{3}{4}$ in., minutely setulose above, afterwards glabrous; petiole $\frac{1}{3}$ in. *Pedicels* $\frac{2}{3}$ in., 1–7 together. *Calyx* in flower $\frac{1}{10}$ in. long and broad; teeth 5 or 10, very obscure. *Berry* $\frac{1}{4}$ in. diam., globose, smooth. *Seeds* $\frac{1}{18}$ in. diam., subtriangular, smooth.—Perhaps not distinct from *S. Blumei,* Nees (Blume Bijd. 696), which has broader leaves.

8. **S. bigeminatum,** *Nees in Trans. Linn. Soc.* xvii. 42; leaves elliptic acuminate at both ends entire glabrous or nearly so, flowering calyx cup-shaped entire or obscurely toothed fruiting saucer-shaped subentire, corolla $\frac{1}{4}$ in. long. *Dunal in DC. Prodr.* xiii. pt. i. 175. S. Neesianum, *Dalz. & Gibs. Bomb. Fl.* 175, *and of Wight Herb., not of Wall. & Nees.* S. cupulatum, *Miq. in Pl. Hohenack. n.* 1415. S. angulosum and flexuosum, *Heyne in Herb. Madras.*

Mts. of the S. Deccan; Nilgherries, Travancore; *Heyne, Wight,* &c. Malabar Ghauts, *Ritchie.*

Very nearly allied to *S. subtruncatum. Leaves* $6\frac{1}{2}$ by 3 in., membranous, sparsely setulose above, margins minutely ciliate; petiole $\frac{1}{2}$–1 in. *Pedicels* 1–6 together, $\frac{3}{4}$ in. *Berry* $\frac{1}{3}$ in. diam. *Seeds* $\frac{1}{8}$ in. diam.; testa lax, subsquamose.

Var. *zeylanica*; leaves smaller less membranous, pedicels shorter rusty-puberulous. S. membranaceum, *Thwaites Enum.* 216, not of Wall.—Ceylon, *Gardner, Wight, Thwaites.*

9. **S. læve,** *Dunal Solan. Synop.* 22; leaves elliptic-lanceolate acuminate at both ends entire glabrous or nearly so, flowering calyx with 5 linear teeth $\frac{1}{8}$ in., fruiting prominently toothed, corolla $\frac{1}{4}$ in. *Nees in Trans. Linn. Soc.* xvii. 41. S. membranaceum, *Wall. Cat.* 2625; *Nees l. c.*; *Dunal in DC. Prodr.* xiii. pt. i. 143.

Nilgherries, *Wight*; alt. 6000 ft., *Clarke.*

A nearly glabrous shrub. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{4}$ in., green, membranous, minutely sparsely setulose above, soon glabrous; petiole $\frac{2}{3}$ in. *Pedicels* 1–5 together, $\frac{2}{3}$ in. *Berry* and *seeds* nearly as of *S. bigeminatum,* from which it hardly differs but by the distinct calyx-teeth.

10. **S. denticulatum,** *Blume Bijd.* 697; leaves elliptic-lanceolate acuminate at both ends subentire setulose often pubescent, calyx-teeth usually 7–8 small divaricate, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Nees in Trans. Linn. Soc.* xvii. 41, *excl. syn. Wallich*; *Wight Ic.* t. 1397; *Dunal in DC. Prodr.* xiii. pt. i. 181. S. membranaceum and crassipetalum, *Herb. Wight not of Wall.*

MTS. of the DECCAN PENINSULA, alt. 4–8000 ft., and CEYLON, frequent.—DISTRIB. Malay Islands.

A woody, somewhat rigid shrub. *Leaves* 3 by $1\frac{1}{2}$ in., young almost villous, mature setulose above, pubescent often rusty on the nerves beneath; petiole $\frac{1}{2}$ in. *Pedicels* 1–4 together, $\frac{2}{3}$ in. *Calyx-teeth* lanceolate, minute; in fruit $\frac{1}{8}$ in. or 0 on the same shrub. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. *Seeds* $\frac{1}{8}$ in. diam. and upwards, smooth or nearly so.

VAR. *Gouakai*; leaves angular and sometimes with acute lobes $\frac{1}{4}$ in. long. S. Gouakai, *Dunal in DC. l. c.* 177.—Pulney Mts.; *Wight.* Ceylon; *Walker.*

11. **S. biflorum,** *Lour. Fl. Cochinch.* 129, *not of D. Don*; leaves elliptic or oblong acuminate at both ends entire glabrous setulose or pubescent, calyx-teeth 10 in flower $\frac{1}{12}$ in. narrow-lanceolate, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. *Dunal in DC. Prodr.* xiii. pt. i. 178; *Kurz For. Fl.* 224. S. decemdentatum, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 565; *Wall. Cat.* 2614; *Dunal l. c.* 179. S. mollissimum, *Blume Bijd.* 698; *Nees in Trans. Linn. Soc.* xvii. 45; *Dunal l. c.* 178. S. decemfidum, *Nees l. c.* 43. S. Zollingeri, Calleryanum and Osbeckii, *Dunal l. c.* 176, 178, 179.

SINGAPORE; *Wallich.* MERGUI and MALACCA; *Griffith.*—DISTRIB. Malaya and East Ava.

A shrub; shoots flocculose-setose or nearly glabrous. *Leaves* 5 by $1\frac{3}{4}$ in.; petiole $\frac{2}{3}$ in. *Pedicels* 1–6, $\frac{2}{3}$ in. *Flower* and *fruit* nearly as in *S. denticulatum,* from which it only differs in the longer calyx-teeth.—Very variable in indumentum; Roxburgh describes the leaves as villous, the calyx as pubescent; his Ic. Ined. preserved at Kew represents a glabrous form.

12. **S. macrodon,** *Wall. Cat.* 2621; erect, shrubby, leaves elliptic-lanceolate acuminate at both ends entire setulose above, pedicels 1–8 together, calyx-teeth in flower $\frac{1}{8}$ in. linear hispidulous, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. *Nees in Trans. Linn. Soc.* xvii. 43; *Dunal in DC. Prodr.* xiii. pt. i. 180. S. biflorum, *Don Prodr.* 96, *excl. syn., not of Lour.*

TEMPERATE HIMALAYA, alt. 4–8000 ft., from Nepal to Bhotan, common. KHASIA MTS., alt. 3–5000 ft., common.

A small shrub setulose with jointed, submoniliform, glistening hairs. *Leaves* 6 in. in large examples, or 2 in. in high level forms; petiole $\frac{1}{8}$–$\frac{3}{4}$ in. *Pedicels* $\frac{1}{2}$–1 in., mostly 2–6 together, sometimes solitary. *Calyx-teeth* (in flower) terminal, alternate sometimes shorter. *Corolla-lobes* oblong, acute, purple rose or nearly white, with 2 green glandular spots near the base. *Berry* $\frac{1}{4}$ in. diam., globose. *Seeds* $\frac{1}{8}$ in. diam., subtriangular, smooth.

VAR. *lysimachioides*; stems slender procumbent often rooting at the nodes, pedicels solitary. *Wall. Cat.* 2609, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 257; *Nees in Trans. Linn. Soc.* xvii. 44; *Dunal in DC. Prodr.* xiii. 181.—Temperate Himalaya, from Kumaon (*Strachey & Winterbottom*) to Bhotan. Khasia Mts. alt. 3–5000 feet.

13. **S. crassipetalum,** *Wall. Cat.* 2618, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 256; erect, shrubby, leaves elliptic-lanceolate acuminate at both ends entire glabrous or sparsely setulose, pedicels 1–8 together, calyx-teeth in flower $\frac{1}{24}$–$\frac{1}{12}$ in. triangular glabrous or pubescent from a compressed base below the calyx-rim, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. *Nees in Trans. Linn. Soc.* xvii. 42. Bassovia? Wallichii, *Dunal in DC. Prodr.* xiii. 409.

TEMPERATE HIMALAYA, alt. 3–8000 ft.; from Nepal to Bhotan, very common.

A shrub, 2–9 feet. *Leaves* 6 by $2\frac{1}{2}$ in. (sometimes 9–10 in.); usually nearly glabrous, sometimes abundantly flocculose-setulose; petiole $\frac{2}{3}$ in. *Calyx-teeth* in flower below the limb, bases compressed decurrent on the tube, points linear-obtuse divaricate horizontally. *Corolla* and *berry* nearly as of *S. macrodon.*—The thickening of the petals observed in the few examples of Wallich frequently occurs in this species, but in abnormal flowers with imperfect stamens, and is perhaps due to some

insect. At all events, normal unthickened flowers abound.—Leaves cooked and eaten in Sikkim (*J. D. H.*).

** Prickly, some varieties of *S. Melongena* rarely unarmed.

14. **S. giganteum,** *Jacq. Coll.* iv. 125, and *Ic. Rar.* ii. t. 328; subarboreous, spinous, leaves oblong cuneate at both ends, and cymes stellately white woolly beneath, cymes terminal dense many-fld. stellately white woolly, berry ¼ in. diam. glabrous. *Dunal Sol.* 202, and in *DC. Prodr.* xiii. pt. i. 258; *Nees in Trans. Linn. Soc.* xvii. 47; *Bot. Mag.* t. 1921; *Wight & Arn. in Ann. Nat. Hist.* i. 395, t. 13; *Wight Ic.* t. 893; *Dalz. & Gibs. Bomb. Fl.* 175. S. niveum, *Vahl Symb.* ii. 41. S. farinosum, *Wall. Cat.* 2610, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 255. S. argenteum, *Heyne in Herb. Rottler.*

MTS. of S. DECCAN and CEYLON, alt. 3–7000 ft., frequent; *Wight, Thwaites,* &c.

Often 10–25 feet high; but in cultivation flowers at 4 feet high; stem thick, soft, prickly, stellately white-woolly. *Leaves* 8 by 3 in., entire, undulate; nerves impressed on the upper surface; petiole 2 in. *Pedicels* very short, in fruit ¼–½ in. *Calyx-lobes* $\frac{1}{20}$ in., triangular, in fruit twice as large. *Corolla* ¾ in. diam., blue; tube nearly as long as the lobes. *Ovary* puberulous. *Seeds* ⅛ in. diam., glabrous.

15. **S. ferox,** *Linn.*; *Dunal Sol.* 223, and in *DC. Prodr.* xiii. pt. i. 255; densely stellately woolly, leaves ovate with short triangular lobes, racemes lateral dense, corolla white, berry 1–1½ in. diam. globose hirsute with needle-like hairs greatly exceeding the ovate-triangular calyx-lobes. *Nees in Trans. Linn. Soc.* xvii. 52 (excl. syn. *S. involucratum,* Blume); *Wight Ic.* t. 1399 (excl. var. *minus*); *Kurz For. Fl.* ii. 226, partly, and excl. var. β). S. lasiocarpum, *Blume Bijd.* 701; *Wall. Cat.* 2623; *Dunal Sol.* 222, and in *DC. Prodr.* xiii. pt. i. 252. S. hirsutum, *Roxb. Hort. Beng.* 17, and *Fl. Ind. ed. Carey & Wall.* ii. 253. S. stramonifolium, *Dunal Sol.* 222, and *DC. Prodr.* xiii. pt. i. 252, *not of Jacq. nor of Wall.—Rheede Hort. Mal.* ii. 35.

EASTERN and SOUTHERN INDIA, in the tropical zone, frequent; from Assam to Ceylon and to Tenasserim.—DISTRIB. Hongkong.

Stem herbaceous, stout, 2–4 feet, sub-erect, prickly. *Leaves* 8 by 6 in., closely villous above, stellately fulvous-woolly beneath, lobes 1 in. deep, prickly especially on the nerves; petiole 2½ in. *Peduncles* usually close below the leaves, short; racemes densely stellately woolly and with needle-like hairs, not prickly. *Calyx* shortly funnel-shaped; lobes ¼ in., ovate-triangular not acuminate. *Corolla* densely woolly without, lobes ¾–1 in., oblong, acute. *Ovary* hirsute. *Berry* yellow, needle-like hairs ⅛–⅙ in., fulvous, spreading; fruit-pedicels ½–1 in.; calyx-lobes in fruit unaltered, hardly ¼ the length of the berry. *Seeds* ⅛ in. diam., nearly smooth.—*S. involucratum* (Blume Bijd. 701), the Malay species reduced to *S. ferox* by Nees, has the calyx-lobes produced, in fruit 1 in., ovate-linear, with slender prickles, enclosing the berry.

16. **S. barbisetum,** *Nees in Trans. Linn. Soc.* xvii. 51; hirsute, leaves ovate with short triangular lobes, racemes lateral elongate many-flowered, corolla blue lobes lanceolate acuminate, berry ½ in. diam. globose glabrous enclosed by the prickly calyx. *Dunal in DC. Prodr.* xiii. pt. i. 250. S. eriophorum, *Dunal l.c.* 249. S. involucratum, *Kurz For. Fl.* ii. 224, *not of Blume.*

From N. BENGAL and ASSAM to TENASSERIM, in the subtropical region, alt. 1–5000 ft., frequent, *Wallich, Griffith, H. f. & T.,* &c.

In general appearance, and in the leaves, resembling *S. ferox,* but with close clustered fine hairs, scarcely woolly. *Racemes* 2–6 in.; pedicels very many, ½–1 in., deflexed after flower. *Calyx-lobes* ¼–⅓ in., oblong-lanceolate. *Corolla-lobes* very narrow, acute. *Calyx* in fruit enlarged, tube subglobose with deflexed prickles, teeth closed over the berry. *Seeds* more than ⅛ in. diam., minutely villous.

17. **S. khasianum**, *Clarke*; hirsute, leaves ovate lobed, racemes lateral 1–4-flowered, corolla small lobes lanceolate acuminate, berry 1 in. diam. globose glabrous much longer than the unarmed calyx. Solanum n. 14, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; Nunklow, *H. f. & T.*

A stout species, in indumentum and leaves resembling *S. barbisetum.* *Stem* densely yellow-hirsute, and with straight patent prickles $\frac{2}{3}$ in. *Leaves* 7 by 5 in., deeply lobed, hirsute; prickles $\frac{2}{3}$ in. straight, on both surfaces; petiole 1–2 in. *Peduncles* hardly any; pedicels $\frac{3}{4}$ in. *Sepals* in flower $\frac{1}{4}$ in., lanceolate, hirsute, not prickly. *Corolla* $\frac{2}{3}$ in. diam., nearly glabrous without. *Stamens* equal. *Berries* 1–3 on each peduncle; fruit-sepals $\frac{1}{3}$ in., ovate-lanceolate, hirsute, not prickly. *Seeds* $\frac{1}{8}$ in. diam., smooth.

18. **S. Wightii**, *Nees in Trans. Linn. Soc.* xvii. 51; leaves ovate toothed or lobed hirsute, cymes lateral laxly 1–3-flowered, corolla large tube longer than the lobes, berry glabrous overtopped by the ovate-lanceolate sepals. *Dunal in DC. Prodr.* xiii. pt. i. 1334; *Wight Ic.* t. 841. S. Hohenackeri, *Van Heurck & Muell. in Van Heurck Pl. Nov.* 87.

NILGHERRY MTS., alt. 4–6000 ft.; Canoor Ghat, *Wight, Gardner*, &c.

Herbaceous; shoots tomentose. *Leaves* 4 by $1\frac{3}{4}$ in., villous above, more densely beneath, prickles few; petiole 1 in. *Peduncles* axillary or extra-axillary, short; pedicels $\frac{1}{2}$–2 in. *Calyx-lobes* (in flower) $\frac{1}{2}$ in., oblong-lanceolate. *Corolla* 2 in. diam., blue, woolly without; lobes ovate, shortly acuminate. *Style* minutely sparsely pubescent. *Berry* $\frac{1}{2}$ in. diam., globose; sepals in fruit $\frac{3}{4}$ in., without prickles. *Seeds* $\frac{1}{6}$ in. diam., brown, smooth, without tubercles; the dried testa reticulated by the drying and sinking in of the cells leaving the cell-walls prominent.

19. **S. torvum**, *Swartz Prodr.* 47; stem prickly, leaves ovate sinuate or lobed stellately tomentose beneath without prickles, racemes lateral dense, flowers white, berry $\frac{1}{4}$–$\frac{1}{3}$ in. diam. globose smooth much exceeding the triangular-oblong unarmed calyx-lobes. *Dunal Sol.* 263, t. 23, and in *DC. Prodr.* xiii. pt. i. 260 (*excl. var. γ*); *Nees in Trans. Linn. Soc.* xvii. 53 *a*; *Wight Ic.* t. 345; *Dalz. & Gibs. Bomb. Fl.* 175; *Sendtn. in Mart. Fl. Bras.* x. 94, t. 7, fig. 1–8 *with syn.*; *Kurz For. Fl.* ii. 225. S. stramonifolium, *Roxb. Fl. Ind.* i. 572; *Wall. Cat.* 2627; *perhaps of Lamk. in part, not of Jacq.* S. ferrugineum, *Jacq. Hort. Schoenb.* iii. 46, t. 334; *Dunal Sol.* 36, and in *DC. l. c.* 266. S. pseudosaponaceum, *Blume Bijd.* 702; *Dunal in DC. l. c.* 274. S. Wightii, *Miquel Pl. Hohenack.* n. 36, *not of Nees.*

Throughout INDIA in the tropical region, except the western desert area; very common in Bengal.—DISTRIB. Malaya, China, Philippines, Tropical America.

A shrub, 8–12 feet high, or flowering as a herb. *Leaves* 6 by 4 in., lobes shallow rarely deep, softly hairy above, never prickly; petiole 1 in. *Peduncles* usually extra-axillary, short; racemes many-fld., often dichotomous; pedicels often $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx-lobes* in flower $\frac{1}{6}$ in., lanceolate, sparingly hairy. *Corolla* 1–$1\frac{1}{4}$ in. diam.; lobes $\frac{1}{3}$ in., triangular, pubescent without. *Ovary* and style glabrous. *Berry* yellow; calyx-lobes patent, not half as long as the berry. *Seeds* scarcely $\frac{1}{10}$ in. diam., smooth.—This, when dried, has been much confused with the blue-flowered *S. indicum* and *S. Melongena*; the former may be distinguished by the prickly leaves, the latter by the few-flowered cymes with a much larger berry and fruiting-calyx.

20. **S. indicum,** *Linn. partly*; *Nees in Trans. Linn. Soc.* xvii. 55; leaves ovate sinuate or lobed stellately woolly beneath nerves prickly, racemes lateral many-fld., flowers blue, berry $\frac{1}{4}$ in. diam. globose smooth much exceeding the triangular-oblong calyx-lobes. *Lour. Fl. Cochinch.* 131; *Roxb. Fl. Ind.* i. 570; *Wall. Cat.* 2626; *Wight. Ic.* t. 346; *Dunal in DC. Prodr.* xiii. pt. i. 309; *Dalz. & Gibs. Bomb. Fl.* 174; *Kurz For. Fl.* 226. S. violaceum, *Jacq. Fragm.*

82, t. 133, fig. 1, *not of Br.* S. cuneatum, *Moench Hort. Marb.* 476. S. canescens, *Blume Bijd.* 701. S. pinnatifidum *and* agreste, *Roth Nov. Sp.* 129, 130. S. Heynei, *Roem. & Sch. Syst.* iv. 669. S. Anguivi, *Bojer*; *Hook. Exot. Fl.* t. 199. S. himalense, *Dunal l. c.* 300. S. Junghuhnii, *Miq. Fl. Ind. Bat.* ii. 649.—*Burm. Thes. Zeyl.* 220, t. 102; *Rheede Hort. Mal.* ii. t. 36.

Throughout tropical INDIA; very common, ascending to 5000 ft.—DISTRIB. Malaya, China to the Philippines.

An undershrub, 1–6 ft., much branched, very prickly; prickles compressed, stout, often recurved. *Leaves* 3–6 by 1–4 in., subentire or pinnatifid; petiole 1 in. *Peduncles* short, often extra-axillary; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., stellately woolly. *Calyx-lobes* in flower $\frac{1}{6}$ in., triangular, acute, very woolly, unarmed or with slender straight spines. *Corolla* $\frac{3}{4}$–1 in. diam., blue; lobes broadly triangular, tomentose without. *Ovary* usually glabrous; style stellately pubescent. *Berry* yellow; calyx-lobes patent, woolly, prickles often strengthened in fruit. *Seeds* $\frac{1}{8}$ in. diam. and upwards, smooth or very nearly so.—A Nilgherry form is less prickly, has smaller less lobed leaves, and small corymbs of larger flowers. A plant from the Concan is sparsely prickly and has the leaves very sparsely stellate tomentose. A Punjab example of Thomson has branches with very numerous small thin leaves, a monstrosity that occurs in other Indian species of *Solanum.*

VAR. *multiflora*, Wight; rather stronger, more hairy, racemes stouter longer, stellate pubescence of the style extending over the ovary continued on the fruit or deciduous. S. multiflorum, *Roth Nov. Sp.* 130; *Roem. & Sch. Syst.* iv. 669. S. ferox, *var.* minus, *Wight Ic.* t. 1400. S. torvum, *var. β* inerme, *Nees in Trans. Linn. Soc.* xvii. 54; *var. γ* inerme, *Dunal in DC. Prodr.* xiii. pt. i. 261. S. erosum, *Van Heurck & Muell. in Van Heurck Nov. Pl.* 83.

21. **S. Melongena,** *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 49; leaves ovate sinuate or lobed stellately woolly beneath prickly rarely all unarmed, cymes lateral few-fld., calyx-lobes lanceolate, flowers blue, berry glabrous exceeding the calyx-lobes in cultivation often large ellipsoid or elongate white yellow or dark-purple. *Lour. Fl. Cochinch.* 130; *Roxb. Fl. Ind.* i. 566; *Wall. Cat.* 2628; *Wight Ill.* t. 166; *Dalz. & Gibs. Bomb. Fl. Suppl.* 61; *Sendtn. in Mart. Brasil. Sol.* 77. S. incanum, *Linn.*; *Dunal in DC. Prodr.* xiii. pt. i. 368. S. insanum, *Linn. Mant.* 46; *Roxb. Fl. Ind.* i. 568. S. zeilanicum, *Scop. Delic.* t. 1. S. undatum, *Lamk. Dict.* iv. 301; *Blume Bijd.* 700; *Dunal l. c.* 359. S. Trongum, *Lamk. Dict.* iv. 308. S. longum, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 567. S. pseudo-undatum, *Blume Bijd.* 699. S. ovigerum, *Blume Bijd.* 698; *Dunal l. c.* 357. S. esculentum, *Dunal Sol.* 208, t. 3, and in *DC. l. c.* 355. S. heteracanthum, *Dunal*; *Nees l. c.* 51; *Dunal l. c.* 365. S. melanocarpum, sativum, pressum *and* Cumingii, *Dunal l. c.* 355, 360, 362 and 363. S. torvum, *var.* inerme, *Dalz. & Gibs. Bomb. Fl.* 175. S. ferox, *var. β*, *Kurz For. Fl.* ii. 226, *not of Linn.*—*Rumph Herb. Amb.* v. t. 85, and t. 86, fig. 1; *Rheede Hort. Mal.* ii. t. 37, and x. t. 74.

INDIA; generally cultivated.—DISTRIB. Cultivated in the warmer regions of the globe.

Herbaceous, 2–8 ft.; prickly, or sometimes nearly unarmed. *Leaves* 3–6 by 2–4 in.; petiole 1 in. *Peduncles* mostly extra-axillary, often paired, one bearing a perfect flower, the other a short raceme of male flowers; or the raceme may be considered sessile with the lowest flower only perfect. *Calyx-lobes* in flower $\frac{1}{4}$–$\frac{1}{3}$ in., elliptic or oblong-linear. *Corolla* 1–1$\frac{1}{4}$ in. diam., shortly lobed, hairy on the plaits without. *Style* stellately pubescent, or glabrous. *Berry* 1–9 in., very variable in cultivation; calyx-lobes enlarged, usually much shorter than the fruit, often prickly.—Not known wild in India, according to Dalzell and Kurz ll. c.; A. DC. says it is a native of Asia, not America, and Sendtner l. c. fixes its origin in Arabia; all this appears uncertain. As an escape from cultivation it becomes often intensely prickly, and the peduncle carries 1–5 fruits.—The egg-plant, or Brinjal.

22. **S. coagulans,** *Forsk. Fl. Æg.-Arab.* 47; leaves ovate sinuate or lobed stellately woolly beneath prickly, cymes lateral few-fld., calyx-lobes triangular, flowers blue, berry globose glabrous yellow exceeding the prickly calyx-lobes. *Delile Fl. Æg.* t. 23, fig. 1; *Dunal in DC. Prodr.* xiii. pt. i. 369; *Boiss. Fl. Orient.* iv. 286. S. sanctum, *Linn. Sp. Pl.* 269.

W. INDIA; Punjab and Scinde, *Jacquemont, Aitchison*, &c.—DISTRIB. S.W. Asia, Arabia, Egypt.

Very near *S. Melongena*, more rigid and tomentose. *Peduncles* paired, one bearing a single perfect flower, the other a raceme of males. *Calyx-tube* campanulate, often in flower-time strongly spinous. *Corolla* as of *S. Melongena*, more woolly without, lobes rather deeper. *Berry* 1 in. diam.

23. **S. sarmentosum,** *Nees in Trans. Linn. Soc.* xvii. 58; sparsely hairy, leaves broadly elliptic subpinnatifid prickly, peduncles extra-axillary 1–2-fld., berry $\frac{1}{2}$ in. diam. globose glabrous overtopped by the enlarged ovate acuminate-caudate sepals. *Dunal in DC. Prodr.* xiii. pt. i. 357. S. Melongena, *Wall. Cat.* 2628, *letter* F *only*. S. Jacquini, *Miq. Fl. Ind. Bat.* ii. 651, *excl. syn., not of Willd.*

PENANG; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 5914).—DISTRIB. Java, Borneo.

Stem procumbent, somewhat zigzag, not twining; prickles long, straight. *Leaves* 4 by 2 in., obtusely lobed, young sparsely stellately pubescent beneath, mature sparsely hairy or glabrate on both surfaces; petiole $\frac{2}{3}$ in. *Sepals* in flower $\frac{1}{5}$ in., in fruit $\frac{3}{4}$ by $\frac{1}{3}$ in., erect, sparsely hairy, usually prickly. *Corolla* $\frac{2}{3}$ in. diam., stellately pubescent without. *Seeds* $\frac{1}{8}$ in. diam., flocculose-scaly.

24. **S. xanthocarpum,** *Schrad. & Wendl. Sert. Hanov.* i. 8, t. 2; leaves ovate or elliptic sinuate or subpinnatifid glabrescent very prickly, cymes lateral few-fld., corolla blue, berry $\frac{1}{2}$–$\frac{3}{4}$ in. diam. globose glabrous much exceeding the calyx-lobes. *Dunal Sol.* 231, and in *DC. Prodr.* xiii. pt. i. 302; *Kurz For. Fl.* 224. S. Jacquini, *Willd. Sp. Pl.* i. 1041; *Roxb. Fl. Ind.* i. 569; *Wall. Cat.* 2612; *Dunal Sol.* 231; *Nees in Trans. Linn. Soc.* xvii. 56; *Wight Ic.* t. 1401; *Dalz. & Gibs. Bomb. Fl.* 175. S. diffusum, *Roxb. Hort. Beng.* 17, and *Fl. Ind.* i. 568; *Wall. Cat.* 2613. S. virginianum, *Jacq. Ic. Rar.* ii. 332, *not of Linn.* S. armatum, *Br. Prodr.* 446; *Benth. Fl. Austral.* iv. 458, *with syn.*

Throughout INDIA; from the Punjab and Assam to Ceylon and Malacca; common.—DISTRIB. S.E. Asia, Malaya, Trop. Australia and Polynesia.

A very prickly, diffuse herb, 1–4 ft. diam., bright green, mature nearly glabrous. *Leaves* 4–5 by 2–3 in.; spines $\frac{1}{2}$ in., straight; petiole 1 in. *Peduncles* short, mostly extra-axillary; flowers few, all perfect; pedicels and calyx stellately pubescent, or at length glabrous. *Calyx* in flower $\frac{1}{5}$ in.; lobes ovate-oblong, usually prickly, hardly enlarged in fruit. *Corolla* 1 in. diam., pubescent without; lobes shallow. *Berry* yellow, or whitish and green-blotched. *Seeds* $\frac{1}{12}$ in. diam., glabrous.—Has been supposed to extend to Tropical Africa (see *Schweinf. Pl. Nilot.* 25, t. 9); but in the African plant the flowers are larger, the fruit very much larger, the habit different.

25. **S. trilobatum,** *Linn.*; *Burm. Fl. Ind.* 57, t. 22; shoots stellately pubescent, leaves ovate or elliptic irregularly sinuate or lobed prickly soon glabrate, cymes lateral 2–8-fld., corolla blue, berry $\frac{1}{4}$–$\frac{1}{3}$ in. diam. globose much exceeding the calyx-lobes. *Roxb. Fl. Ind.* i. 571; *Wall. Cat.* 2622; *Dunal Sol.* 225, and in *DC. Prodr.* xiii. pt. i. 287; *Wight Ic.* t. 854; *Dalz. & Gibs. Bomb. Fl.* 175; *Kurz For. Fl.* 224. S. acetosæfolium, *Lamk. Dict.* iv. 306; *Dunal Sol.* 226. S. canaranum, *Miq. in Pl. Hohenack.* n. 740.

W. DECCAN PENINSULA; from the Concan, southward, &c., frequent. MALAY

PENINSULA; from Arracan to Malacca, in the tidal swamps, frequent. CEYLON; drier parts of the island.

A scandent undershrub, 6–12 ft., nearly glabrous; prickles short, stout, compressed, recurved. *Leaves* 3 by 1½ in., irregularly obtusely sinuate or lobed, base not cordate; petiole ½–1½ in. *Peduncles* short, mostly extra-axillary; pedicels ½–1½ in., with short, strong, recurved prickles. *Calyx-lobes* ⅕ in., ovate-oblong, minutely stellately pubescent or glabrate, rarely prickly, hardly enlarged in fruit. *Corolla* 1–1¼ in. diam., pubescent without; lobes triangular-lanceolate, as long as the tube. *Seeds* ⅛ in., smooth, or very nearly so.

VAR. ? *Griffithii*; leaves 2½ by ⅛ in. linear.—Malay Peninsula, *Griffith* (Kew Distrib. n. 5915).

26. **S. gracilipes**, *Dcne. in Jacquem. Voy. Bot.* 113, t. 119; minutely stellately pubescent, stem prickly, leaves ovate or orbicular sinuate often subcordate not prickly, peduncles axillary short 1–3-fld. or pedicels subterminal 1–3 together on very short lateral spurs, berry ¼ in. diam. globose glabrous exceeding the sublinear sepals. *Dunal in DC. Prodr.* xiii. pt. i. 286; *Boiss. Fl. Orient.* iv. 286. S. Jacquemonti, *Dunal l. c.* 287.

WESTERN INDIA; Punjab and Scinde, *Jacquemont, Stocks, Dalzell.*—DISTRIB. Beloochistan.

An undershrub; prickles short, conical, subrecurved. *Leaves* 1½ in. diam., obtuse, rarely lobed, usually shallowly cordate; petiole ¾ in. *Peduncles* very short or 0; pedicels ½–1½ in., slender. *Calyx-lobes* ⅕ in., linear; in fruit ¼ in. *Corolla* ⅝ in. diam., deeply lobed. *Seeds* ⅛ in. diam., smooth.—This is believed to be *S. cordatum*, Forsk. Fl. Æg.-Arab. 47 (Dunal Sol. 239, *and in* DC. Prodr. xiii. 373), an Arabian species of which no authentic example can be seen.

27. **S. aculeatissimum**, *Jacq. Coll.* i. 100, and *Ic. Rar.* i. t. 41; prickles very many long straight slender, leaves ovate lobed sparsely hairy, peduncles 1–7-fld. mostly 1-fruited, berry 1¼ in. diam. globose smooth, fruiting-calyx small prickly. *Dunal in DC. Prodr.* xiii. pt. i. 244.

SINGAPORE; *G. Thomson.*—DISTRIB. Malaya, Tropical America?

The example of G. Thomson (in fruit) is identical with Zollinger, n. 529, which is the type of *S. aculeatissimum*, var. *denudatum*, Dunal l. c. *Stems* glabrous (in the var. *denudatum*) or minutely puberulous upwards. *Leaves* 3–5 in. *Peduncles* in fruit ¾ in. *Calyx* in fruit scarcely ¼ in., but very prickly. *Seeds* ⅛ in. diam., extremely compressed, almost winged.

1*. LYCOPERSICUM, *Miller*.

Tall, pubescent herbs. *Leaves* pinnate; pinnæ toothed or lyrate. *Cymes* peduncled, few-fld. *Sepals* 5–6, narrow, unaltered in fruit. *Corolla* rotate, tube very short; limb 5–6-fid, plaited in bud. *Stamens* 5–6, on the corolla-tube; anthers connivent in an elongate cone, dehiscing by slits. *Ovary* 2–3-celled; style cylindric, stigma small capitate. *Seeds* many, compressed, papillose; embryo peripheric.—Species 3–4, American.

L. esculentum, *Miller*; *Dunal Sol.* 113, t. 3, fig. C., and in *DC. Prodr.* xiii. 26; *Nees in Trans. Linn. Soc.* xvii. 61. L. cerasiforme, *Dunal Sol.* 113, t. 3, fig. B., and in *DC. Prodr.* xiii. 26; *Nees l. c.* 62, with several other species of Dunal. Solanum Lycopersicum, *Linn.*; *Roxb. Fl. Ind.* i. 565; *Wall. Cat.* 2611. S. Humboldtii, *Willd. Hort. Berol.* i. 27, t. 27. S. pseudolycopersicum, *Jacq. Hort. Vind.* i. t. 11.

Cultivated, and as an escape, in INDIA.—DISTRIB. Native of Tropical America.

Flowers ⅜ in. diam., yellow; in cultivation 2–6-merous, or "double." *Berry* ½ in. diam., globose red; or, in cultivation, enlarged, pyriform or depressed globose, very variable.—The Tomato.

2. **PHYSALIS**, *Linn.*

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-fid half-way down; in fruit greatly enlarged, loosely enclosing the fruit; teeth small, connivent. *Corolla* campanulate, lurid-yellow, sometimes with purple spots below. *Stamens* 5, attached near the base of the corolla; anthers oblong, shorter than the filaments, dehiscing longitudinally. *Ovary* 2-celled; style linear, stigma obscurely 2-lobed. *Berry* globose. *Seeds* many or few, smooth or tuberculate-rugose, compressed; embryo peripheric.—Species 30, mostly of Tropical America, several introduced in the Old World.

1. **P. minima**, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 69; leaves ovate sinuate angular or scarcely lobed, corolla $\frac{1}{4}$ in., fruit-calyx $\frac{1}{2}$–1 in. ovoid or subglobose. *Roxb. Fl. Ind.* i. 563; *Wall. Cat.* 2633; *Dunal in DC. Prodr.* xiii. pt. i. 445. P. parviflora, *Br. Prodr.* 447; *Dunal l. c.* 444. P. divaricata, *Don Prodr.* 97; *Dunal l. c.* 444. P. villosa, *Roth Nov. Sp.* 122. P. Rothiana, *Roem. & Sch. Syst.* iv. 677. P. Hermanni, *Dunal. l. c.* 444. P. pubescens, *Wight Ill.* t. 166 *b.* fig. 6, *not of Linn.*—*Rheede Hort. Mal.* x. t. 71.

Throughout INDIA, in the tropical region; common.—DISTRIB. Tropical Asia, Africa and Australia.

An herbaceous, pubescent annual. *Leaves* 2 in.; petiole 1 in. *Pedicels* $\frac{1}{4}$–$\frac{1}{2}$ in. *Calyx* at flower-time $\frac{1}{8}$–$\frac{1}{6}$ in.; lobes lanceolate, half the length of the calyx, often hirsute, sometimes glabrescent. *Corolla* clear yellow; or, in the less common form (*P. Hermanni*), spotted within at the base. *Berry* $\frac{1}{2}$ in. diam.; fruit-calyx globose, 5- or 10-ribbed. *Seeds* very many, $\frac{1}{12}$ in. diam., discoid, reticulated, scarcely scabrous.—Roxburgh says that his *S. pubescens* was the same as *P. peruviana.* The sheet of Rottler's marked *S. pubescens* by Heyne is *P. minima* with one piece of *S. peruviana* mixed.

VAR. *indica*; glabrescent, fruiting calyx 5-angular. *Lamk. Dict.* ii. 102; *Nees in Trans. Linn. Soc.* xvii. 70; *Dunal in DC. Prodr.* xiii. pt. i. 443. P. pseudo-angulata, *Blume Bijd.* 706; *Dunal l.c.* 444. P. angulata, *Wall. mss.*; *Griff. Notul.* iv. 96. Nicandra indica, *Roem. & Sch.* iv. 682.—*Rheede Hort. Mal.* x. t. 70.—Throughout INDIA. The true *P. angulata*, Linn., occurs only cultivated in India.

2. **P. peruviana**, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 67; leaves ovate sinuate angular or scarcely lobed, corolla $\frac{1}{2}$ in., fruit-calyx 1–1$\frac{3}{4}$ in. ovoid conic. *Roxb. Fl. Ind.* i. 562; *Wall. Cat.* 2634; *Dunal in DC. Prodr.* xiii. pt. i. 440; *Dalz. & Gibs. Bomb. Fl. Append.* 61. P. edulis, *Sims Bot. Mag.* t. 1068. P. pubescens, *Don Prodr.* 97.

Throughout INDIA, cultivated.—DISTRIB. Indigenous in Tropical America; extensively cultivated in the Old World.

Resembling *P. minima*, but stouter, flowers and fruit-calyx larger, usually villous or pubescent. *Corolla* with 5 large purple spots near the base within.—Cape Gooseberry of the English denizens.

2*. **CAPSICUM**, *Linn.*

Annual or perennial herbs, glabrous or nearly so. *Leaves* entire or repand. *Pedicels* axillary or 2–3 together. *Calyx* campanulate, subentire or minutely 5-toothed, much shorter than the fruit. *Corolla* rotate; lobes 5, valvate in bud. *Stamens* 5, attached near the base of the corolla; anthers not longer than the filaments, dehiscing longitudinally. *Ovary* 2- rarely 3-celled; style linear, stigma subcapitate. *Berry* very variable in form and size, many-

seeded. *Seeds* discoid, smooth or subscabrous; embryo peripheric.—DISTRIB. Species 20, native in America, some cultivated in all warm countries.

1. **C. frutescens**, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 63; pedicels solitary, berry pendent elongate-oblong often curved red orange or yellow. *Lamk. Ill.* t. 116, fig. 1; *Roxb. Fl. Ind.* i. 574; *Blume Bijd.* 704; *Wall. Cat.* 2642; *Fingerh. Caps.* 17, t. 4, fig. *e*; *Dunal in DC. Prodr.* xiii. pt. i. 413.—*Rheede Hort. Mal.* ii. t. 56.

Throughout INDIA, universally cultivated.—DISTRIB. Cultivated in all the warmer parts of the globe; native place uncertain.—Chillee of the English denizens.

Fruit often 3 by 1 in., tapering at the end.

2. **C. minimum**, *Roxb. Hort. Beng.* 17, and *Fl. Ind.* i. 574, and *ed. Carey & Wall.* ii. 261; pedicels mostly 2–3 together, berry small suberect elongate oblong. *Wall. Cat.* 2641. C. fastigiatum, *Blume Bijd.* 705; *Nees in Trans. Linn. Soc.* xvii. 64; *Dunal in DC. Prodr.* xiii. pt. i. 416; *Wight. Ic.* t. 1617; *Bentl. & Trim. Med. Pl.* t. 188. C. baccatum, *Wall. Cat.* 2644.

Throughout INDIA, extensively cultivated.—DISTRIB. Malaya cultivated; native place uncertain.

Berries often 1½ by ½ in., red.—Bird's-eye Chillee of the English denizen.

3. **C. grossum**, *Willd. Sp. Pl.* i. 1051; pedicels solitary nodding in fruit, berry ovoid. *Roxb. Fl. Ind.* i. 574; *Wall. Cat.* 2643; *Fingerh. Caps.* 21, t. 5, fig. *c, d*, and t. 6, fig. *a*; *Nees in Trans. Linn. Soc.* xvii. 62; *Dunal in DC. Prodr.* xiii. pt. i. 422.

In INDIA cultivated.—DISTRIB. Native place uncertain.

Berry often 3 by 2 in., red.

VAR. *cerasiformis*; berry ¾ in. diam., globose. C. cerasiformis, *Lamk. Dict.* v. 325; *Roxb. Fl. Ind.* i. 575. C. chamæcerasus, *Nees in Trans. Linn. Soc.* xvii. 65; *Dunal in DC. Prodr.* xiii. pt. i. 429.—In India, rarely cultivated.

3. WITHANIA, *Pauq.*

Unarmed shrubs. *Leaves* entire. *Flowers* axillary, sessile or shortly pedicelled, fascicled or solitary, sometimes diœcious. *Calyx* campanulate, 5–6-toothed, enlarged in fruit, subglobose. *Corolla* campanulate; lobes 3–6, short, valvate in bud. *Stamens* attached near the base of the corolla; anthers oblong, dehiscing longitudinally. *Ovary* 2-celled; style linear, stigma shortly 2-fid. *Berry* globose. *Seeds* very many, discoid; embryo peripheric.—Species 4; the Mediterranean region to the Cape of Good Hope and Bengal.

1. **W. somnifera**, *Dunal in DC. Prodr.* xiii. pt. i. 453; thinly woolly, leaves ovate, calyx-teeth short very acute, flowers hermaphrodite, fruit-calyx inflated papery larger than the berry. *Boiss. Fl. Orient.* iv. 287. Physalis somnifera, *Link*; *Gaertn. Fruct.* ii. 239, t. 131; *Jacq. Ecl.* t. 22; *Sibth. Fl. Græc.* t. 233; *Cav. Ic.* t. 103; *Nees in Trans. Linn. Soc.* xiii. 66; *Wight Ic.* t. 853; *Dalz. & Gibs. Bomb. Fl.* 175. P. flexuosa, *Linn.*; *Jacq. Ecl.* t. 23; *Roxb. Fl. Ind.* i. 561; *Wall. Cat.* 2635. P. arborescens *and* tomentosa, *Thunb. Fl. Cap.* (ed. *Schultes*) 190, 191.—*Rheede Hort. Mal.* iv. t. 55.

Throughout drier, subtropical INDIA; frequent in the west and Hindostan, rare in Lower Bengal.—DISTRIB. Mediterranean region, with the Canaries; Cape of Good Hope.

Erect, 1–5 ft.; branches round. *Leaves* 2–4 in., subacute; petiole ¼–½ in. *Pedicels* 0–¼ in. *Calyx* in flower ⅕ in., in fruit ¾ in. *Corolla* ¼–⅓ in., greenish or

lurid yellow. *Filaments* linear; anthers level with the stigma. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Seeds* $\frac{1}{12}$ in. diam., smooth.

2. **W. coagulans,** *Dunal in DC. Prodr.* xiii. pt. i. 685; stellately puberulous, leaves oblong obtuse, calyx-teeth triangular, flowers polygamo-diœcious, fruit-calyx leathery closely surrounding the berry. *Boiss. Fl. Orient.* iv. 288. Puneeria coagulans, *Stocks in Hook. Ic.* t. 801; *Wight Ic.* t. 1616.

PUNJAB and SCINDE; frequent. SUTLEDGE VALLEY; alt. 3300 ft., *Thomson.*—DISTRIB. Cabul and Beloochistan.

A somewhat rigid, grey undershrub. *Leaves* 1–2 in., attenuate at the base; petiole indistinct or $\frac{1}{4}$ in. *Pedicels* 0–$\frac{1}{4}$ in. *Calyx* in flower $\frac{1}{5}$ in.; in fruit $\frac{2}{3}$ in., stellately mealy. *Corolla* $\frac{1}{3}$ in., lurid yellow, stellately mealy without. *Male fl.* filaments linear; anthers subexsert; ovary ellipsoid; style 0. *Hermaphrodite fl.*; anthers subsessile, perfect, near the base of the corolla-tube; ovary globose; style linear, stigma level with the mouth of the tube. *Berry* and *seeds* nearly as in *W. somnifera.*—This plant has been found in the act of passing from dimorphism to diœcism.—"The Cheesemaker."

3*. NICANDRA, *Adans.*

An annual, glabrous herb. *Leaves* petioled, ovate-lanceolate, toothed or lobed. *Pedicels* axillary, solitary. *Calyx* sub- 5-partite; sepals in fruit much enlarged, cordate-ovate, acute, reticulate. *Corolla* campanulate, blue; limb 5-plaited. *Stamens* attached near the base of the corolla, filaments linear; anthers oblong, dehiscing longitudinally. *Ovary* 3–5-celled; style linear, stigma obscurely 3–5-lobed; ovules very many. *Berry* globose, 3–5-celled. *Seeds* very many, compressed, subdiscoid; embryo peripheric.

N. physaloides, *Gaertn. Fruct.* ii. 237, t. 141; *Bot. Mag.* t. 2458; *Dunal in DC. Prodr.* xiii. pt. i. 434. Atropa physaloides, *Linn.*; *Jacq. Obs.* iv. t. 98. Physalis daturæfolia, *Lamk. Dict.* ii. 102.

SUBTEMPERATE HIMALAYA; alt. 3–6000 ft., from Kashmir to Sikkim, introduced. MTS. of W. DECCAN PENINSULA, introduced.—DISTRIB. Native of Peru; widely cultivated.

Leaves 4–7 in. *Pedicels* 1 in. *Corolla* 1 in. diam. *Sepals* in fruit 1 by $\frac{2}{3}$ in., deeply cordate at the base, overlapping so as to simulate a 5-angular calyx.

4. LYCIUM, *Linn.*

Spinous shrubs, glabrous or puberulous. *Leaves* small, alternate or often fascicled at the nodes, entire, linear or oblong. *Pedicels* solitary or fascicled at the nodes; flowers small. *Calyx* campanulate, at first 5-merous, then irregularly 3–5-lobed or 2-lipped; in fruit not enlarged. *Corolla* funnel-shaped; lobes 5–4, imbricate in bud. *Stamens* 5–4, on the corolla-tube; anthers oblong, exsert or included, dehiscing longitudinally. *Ovary* 2-celled; style filiform, stigma subcapitate; ovules few or many. *Berry* small, globose or oblong. *Seeds* several, few or 1, compressed; embryo peripheric.—Species 40; all temperate and subtropical regions, especially S. Africa and S. America.

1. **L. europæum,** *Linn.*; *Sibth. Fl. Græc.* t. 236; leaves linear-oblong, pedicels short, calyx 5-lobed irregularly, corolla-lobes not half so long as the tube, filaments glabrous at their base. *Miers Ill. S. Amer. Pl.* ii. 95, t. 64, fig. B; *Brand. For. Fl.* 345; *Boiss. Fl. Orient.* iv. 288. L. indicum, *Wight Ic.* t. 1403; *Miers l. c.* 97, t. 64, fig. E, *not of Retz.* L. mediterraneum, *Dunal in DC. Prodr.* xiii. pt. i. 523. L. sævum, orientale, *and* persicum, *Miers l. c.* 95.

99, 100, t. 64, fig. A, B. L. intricatum, *Boiss.*; *Dunal in DC. Prodr.* xiii. pt. i. 525; *Miers l. c.* 98, t. 64, fig. E. L. arabicum, *Schweinf.*; *Boiss. Fl. Orient.* iv. 289.

W. INDIA; alt. 0–5000 ft., frequent.—DISTRIB. Mediterranean region, W. Asia.

A spinous, nearly glabrous shrub. *Leaves* ½–1 in. *Pedicels* shorter or equalling the calyx, rarely longer. *Calyx* ⅛ in., often sub-bilabiate; teeth rarely less than 5. *Corolla* ½ in., from purple to nearly white. *Stamens* exsert or subincluded. *Berry* ⅙ in. diam., subglobose, many-seeded.

2. **L. barbarum**, *Linn.*; *Boiss. Fl. Orient.* iv. 289; leaves linear-oblong, pedicels short, calyx 5-lobed irregularly, corolla-lobes more than half as long as the tube, filaments glabrous at their base. *Brand. For. Fl.* 345; *Miers Ill. S. Amer. Pl.* ii. 117, t. 69, fig. D. L. Edgeworthii, *Dunal in DC. Prodr.* xiii. pt. i. 525; *Miers l. c.* 118, t. 69, fig. F. L. depressum *and* foliosum, *Stocks in Hook. Kew. Journ.* iv. 179.

PUNJAB and SCINDE; alt. 0–3000 ft., *Edgeworth, Stocks.*—DISTRIB. W. Asia.

This is not *L. barbarum*, Linn., as understood by Dunal (in *DC. Prodr.* xiii. pt. i. 511); but it is doubtful whether either of these two ought to be separated specifically from *L. europæum.*

3. **L. ruthenicum**, *Murray*; *Dunal in DC. Prodr.* xiii. pt. i. 514; leaves linear, calyx lobed irregularly often 3–4-toothed, filaments hairy at their base. *Brand. For. Fl.* 346; *Miers Ill. S. Amer. Pl.* ii. 119, t. 70, fig. A; *Boiss. Fl. Orient.* iv. 290. L. tataricum, *Pall. Fl. Ross.* i. 78, t. 49; *Miers l. c.* 122, t. 70, fig. A. L. armatum, *Griff. Ic. Pl. Asiat.* t. 415. L. glaucum, *Miers l. c.* 104, t. 66, fig. D.

N. KASHMIR and BALTISTHAN; alt. 6–9000 ft., frequent, *Thomson*, &c.—DISTRIB. Cabul, Persia, Central Asia.

Thomson regarded this as a var. of *L. europæum.*—*L. turcomannicum*, Turcz. (*Boissier Fl. Orient.* iv. 290) is said to differ by having a red (not black) berry.

5. ATROPA, *Linn.*

A coarse, lurid, glabrous herb. *Leaves* entire, elliptic-lanceolate. *Pedicels* axillary, solitary, nodding. *Flowers* somewhat large, dirty-purple or lurid yellow. *Calyx* large, deeply 5-lobed, scarcely larger in fruit. *Corolla* widely tubular-campanulate: lobes 5, triangular, imbricate in bud. *Stamens* attached near the base of the corolla, filaments linear; anthers oblong, dehiscing longitudinally. *Ovary* 2-celled; style linear, stigma obscurely 2-lobed. *Berry* globose. *Seeds* many, compressed; embryo peripheric.

A. Belladonna, *Linn.*; *Dunal in DC. Prodr.* xiii. pt. i. 464, 690; *Syme Eng. Bot.* t. 934; *Boiss. Fl. Orient.* iv. 291; *Bentl. & Trim. Med. Pl.* t. 193. A. acuminata, *Royle Ill.* 279; *Miers Ill. S. Amer. Pl.* ii. *Append.* 5, t. 76. A. lutescens, *Jacquem. ms.*

WESTERN HIMALAYA, alt. 6–11,000 ft.; from Kashmir to Simla, *Royle, Gen. Munro*, &c.—DISTRIB. Europe to the Caucasus and N. Persia.

Leaves 6 in.; petiole ½ in. *Pedicels* ½–1½ in. *Calyx* in flower ⅓–⅔ in. *Corolla* 1 in.—Leaves are little more acuminate in the Himalayan than in the European plant.

6. MANDRAGORA, *Juss.*

Perennial *herbs*, stemless except the Himalayan species. *Leaves* large, petioled, toothed or subentire. *Pedicels* fascicled, subradical. *Flowers* large, pale purple, reticulate. *Calyx* 5-fid half-way down. *Corolla* campanulate;

lobes broad, imbricate in bud, sinuses induplicate-valvate. *Stamens* 5, filaments linear; anthers oblong, dehiscing longitudinally. *Ovary* 2-celled; style elongate, stigma much dilated. *Berry* globose, juicy. *Seeds* very many, compressed; embryo peripheric.—Species 3 or 4 of the Mediterranean region, and the following.

M. caulescens, *Clarke*; branches 4–8 in., leaves narrowly obovate-oblong sinuate, calyx-lobes triangular ovate. Anisodus humilis, *Hook. f. ms.*

ALPINE SIKKIM, alt. 12–13,000 ft.; Lachen and Tungu, *J. D. H.*

Pubescent or nearly glabrous. *Leaves* 11 by 2 in., obtuse, base much tapering. *Pedicels* 1–3 in.; many-fascicled at the apex of the caudex. *Calyx-lobes* in fruit $\frac{2}{3}$ in., subobtuse. *Berry* $\frac{2}{3}$ in. diam. *Seeds* $\frac{1}{8}$ in. diam.—The examples are in fruit; and appear closely allied to *M. officinarum*, Linn.

7. DATURA, *Linn.*

Coarse, rank-scented herbs (the Indian species), glabrous or minutely pubescent. *Leaves* large, entire sinuate or deeply toothed. *Pedicels* solitary; flowers very large, purple or white. *Calyx* long-tubular, herbaceous, 5-toothed at the apex; in fruit circumsciss above the base. *Corolla* long tubular-funnel-shaped, mouth wide; limb plaited, entire or shortly lobed. *Stamens* attached near the base of the tube, filaments filiform; anthers included, linear, longitudinally dehiscent. *Ovary* 2- or spuriously 4-celled; style filiform, stigma 2-lobed. *Capsule* ellipsoid, 4-celled, spinous (in the Indian species, except in *D. fastuosa*, var. *dubia*), 4-valved or irregularly breaking up near the apex. *Seeds* very many, compressed, rugose; embryo peripheric.—Species 10; temperate and tropical regions.

SECT. I. **Stramonium.** *Capsule* deeply 4-valved, often nearly to the base.

1. **D. Stramonium,** *Linn.*; *Bernh. in Linnæa*, 1833, *Litt.* 139; glabrous or farinose puberulous, leaves ovate toothed or sinuate, corolla white teeth 5 linear, capsule equally spinous on all sides. *Wall. Cat.* 2637, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 239; *Dunal in DC. Prodr.* xiii. pt. i. 540; *Syme Eng. Bot.* t. 935; *Boiss. Fl. Orient.* iv. 292; *Bentl. & Trim. Med. Pl.* t 192. D. ferox, *Nees in Trans. Linn. Soc.* xvii. 75, *not of Linn.* D. Wallichii, *Dunal l. c.* 539. Stramonium vulgatum, *Gaertn. Fruct.* ii. 243, t. 132, fig. 4.

TEMPERATE HIMALAYA; from Kashmir, *Thomson*, to Sikkim, *J. D. H.*—DISTRIB. Nearly throughout the globe, in temperate and warm climates.

A coarse annual, 2–6 ft. *Leaves* 7 by 4 in.; petiole 1 in. *Pedicels* 0–$\frac{1}{4}$ in. *Calyx* 1–1$\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in.; lobes $\frac{1}{4}$ in., ovate-lanceolate. *Corolla* 3–6 in., mouth 1–3 in. diam.; lobes $\frac{1}{4}$ in. *Capsule* 1$\frac{1}{2}$ by 1 in.; spines $\frac{1}{5}$ in., subulate; calyx-base $\frac{1}{5}$ in., persistent.

VAR. *Tatula*; flowers purple without and within. D. Tatula, *Willd. Sp. Pl.* i. 1008; *Sweet Brit. Fl. Gard.* t. 83; *Wall. Cat.* 2640; *Bernh. in Linnæa*, 1833, *Litt.* 140.—Throughout India.—Distrib. Nearly as of *D. Stramonium*, from which it is not easily separable.

SECT. II. **Dutra.** *Capsule* subindehiscent, or irregularly dehiscent near the apex.

2. **D. fastuosa,** *Linn.*; *Wight Ic.* t. 1396; leaves ovate entire or deeply toothed glabrous, corolla purple limb shortly 5–6-toothed. capsule nodding or suberect. *Roxb. Fl. Ind.* i. 561; *Wall. Cat.* 2639; *Nees in Trans. Linn. Soc.* xvii. 74; *Dunal in DC. Prodr.* xiii. pt. i. 542. D. Hummatu, *Bernh. in*

Linnæa, 1833, *Litt.* 141; *Dalz. & Gibs. Bomb. Fl.* 174.—*Rheede Hort. Mal.* 2, t. 28; *Rumph. Herb. Amb.* v. t. 87, fig. 2.

Throughout INDIA; in waste places, a weed.—DISTRIB. Malaya, Tropical Africa. In America said to be not a native.

Generally resembling *D. Stramonium*; but the flowers are usually larger. *Calyx* attaining 3 in. *Corolla* 7 in. and 5 in. diam. across the mouth. *Capsule* 1¼ in. diam., subglobose, equally spinous on all sides.

VAR. *alba*; flowers white or nearly so. D. alba, *Nees in Trans. Linn. Soc.* xvii. 73; *Wight Ic.* t. 852; *Dunal in DC. Prodr.* xiii. pt. i. 542; *Dalz. & Gibs. Bomb. Fl.* 174. D. Metel, *Roxb. Fl. Ind.* i. 561; *Wall. Cat.* 2639, *not of Linn.*—*Rumph. Herb. Amb.* v. t. 87, fig. 1. Throughout India. Distrib. of *D. fastuosa*.

VAR. ? *dubia*; fruit without spines. D. dubia, *G. Don Gen. Syst.* iv. 474. D. Hummatu, *var.* a dubia, *Bernh. in Linnæa*, 1833, *Littl.* 141. D. Nilhummatu, *Dunal in DC. Prodr.* xiii. pt. i. 542.—*Rheede Hort. Mal.* ii. tt. 29, 33.—W. Deccan Peninsula?—This species is founded on the figures of Rheede, which represent possibly one of the foreign smooth-fruited species, none of which are wild in India; hence Bernhard appended Rheede's plant as a var. of a species which is always spinous so far as known.

3. **D. Metel**, *Linn.*; *Bernh. in Linn.* 1833, *Litt.* 143; leaves ovate entire or deeply toothed pubescent, corolla whitish purple downwards limb 10-toothed, capsule nodding. *Bot. Mag.* t. 1440; *Dunal in DC. Prodr.* xiii. pt. i. 543.—*Rumph. Herb. Amb.* v. t. 243.

W. HIMALAYA and MTS. of W. DECCAN PENINSULA; introduced?—DISTRIB. Tropical America; widely naturalised in the Old World.

8. SCOPOLIA, *Jacq.*

Erect, glabrescent herbs. *Leaves* entire. *Pedicels* axillary, solitary. *Flowers* lurid, nodding. *Calyx* large, campanulate, subtruncate or shortly lobed; in fruit enlarged, overtopping the capsule. *Corolla* widely campanulate, plaited; lobes short, scarcely imbricate. *Stamens* 5, attached near the base of the corolla; filaments filiform, somewhat dilated near the base; anthers ovate, dehiscing longitudinally. *Ovary* sub-2-celled; style linear, stigma thick dilated. *Capsule* globose, circumsciss above the middle. *Seeds* many, reniform, granulate; embryo peripheric.—Species 3; 1 European, 1 Japanese, 1 Himalayan.

S. lurida, *Dunal in DC. Prodr.* xiii. pt. i. 555; leaves large petioled ovate-lanceolate, corolla wide distinctly lobed, fruit-calyx large reticulated limb very shortly lobed. Physalis stramonifolia, *Wall. Cat.* 2632, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 242. Nicandra anomala, *Link. & Otto Ic. Sel.* 77, t. 35. Anisodus luridans, *Link & Otto in note, l. c.*; *Nees in Trans. Linn. Soc.* xvii. 72; *Miers Ill. S. Amer. Pl.* ii., *App.* 18, t. 78. A. stramonifolius, *G. Don in Loud. Hort. Brit.* 61. Whitleya stramonifolia, *Sweet Brit. Fl. Gard.* t. 125.

CENTRAL HIMALAYA: Nepal, *Wallich*; Sikkim, near Ging, alt. 5000 ft., *Dr. Treutler.*

Branches 3–6 ft., sparingly divided: rusty-tomentose when young, later puberulous or glabrate. *Leaves* 8 by 3 in., acute at both ends, ultimately glabrate; petiole ⅜ in. *Peduncles* 1 in. *Calyx* in flower ⅔ in., in fruit attaining 2 by 1¼ in.; lobes short, irregular. *Corolla* 1¼ by ¾ in., lurid yellow or greenish purple. *Ovary* 2-celled, near the top 1-celled. *Capsule* ¾ in., lid 1-celled, remainder 2-celled. *Seeds* $\frac{1}{12}$ in.

9. PHYSOCHLAINA, *G. Don.*

Erect, nearly glabrous herbs. *Leaves* petioled, subentire. *Corymb* terminal. *Calyx* campanulate, lobes 5 short; in fruit elongated, overtopping the capsule. *Corolla* elongate; lobes 5, short, imbricate in bud. *Stamens* attached at the middle of the tube, filaments filiform; anthers ovate, longitudinally dehiscent. *Ovary* 2-celled; style linear, stigma obscurely 2-lobed. *Capsule* 2-celled; circumsciss above the middle. *Seeds* very many, compressed; embryo peripheric. —Species 4; Central Asiatic.

P. præalta, *Hook. f. Bot. Mag.* t. 4600, *in note*; leaves ovate-oblong sinuate, corymb compound lax viscid-pubescent, corolla $\frac{3}{4}$–$1\frac{1}{4}$ in., stamens and style equalling the corolla or $\frac{1}{3}$ in. longer. *Miers Ill. S. Amer. Pl.* ii. App. 15. P. grandiflora, *Hook. f. Bot. Mag.* t. 4600. Belenia præalta, *Dcne. in Jacquem. Voy. Bot.* 144, t. 120. Hyoscyamus præaltus, *Walp. Rep.* iii. 21. Scopolia præalta, *Dunal in DC. Prodr.* xiii. pt. i. 554.

N. Kashmir and Western Tibet, alt. 12–15,500 ft., *Munro, Thomson, Strachey & Winterbottom*, &c.—Distrib. Kashgar and Yarkand.

Stems 2–4 ft., corymbose upwards. *Leaves* 4–6 by 3 in., irregular, base cuneate or cordate on the same branch; petiole 1–4 in. *Corymb* 2–8 in. diam.; flowers all pedicelled; pedicels $\frac{1}{4}$–$1\frac{1}{2}$ in. *Calyx* in flower $\frac{1}{3}$ in.; lobes $\frac{1}{8}$ in., lanceolate; in fruit $1\frac{3}{4}$ by $\frac{1}{3}$ in., striate. *Corolla* $1\frac{1}{4}$ by $\frac{1}{5}$ in., tubular-funnel-shaped, in the majority of the wild examples, sometimes shorter, funnel-shaped; in some cultivated examples wider, subcampanulate. *Stamens* and *style* distinctly exserted in nearly all the wild examples. *Capsule* $\frac{1}{2}$ in. diam. *Seeds* $\frac{1}{12}$ in. diam., scrobiculate-reticulate.

10. HYOSCYAMUS, *Linn.*

Erect, coarse herbs. *Leaves* sinuate, toothed, or subpinnatifid. *Flowers* unilateral, sessile or pedicelled, lower axillary solitary, upper forming a dense racemose or subscorpioid cyme, upper leaves bract-like. *Corolla* lurid, yellow or greenish purple. *Calyx* urn-shaped, shortly 5-lobed; in fruit enlarged, overtopping the capsule. *Corolla* funnel-shaped; limb oblique, 5-fid, lobes more or less unequal, imbricate in bud. *Stamens* attached about the middle of the corolla-tube, filaments filiform; anthers exserted or subincluded, oblong, dehiscing longitudinally. *Ovary* 2-celled; style filiform, stigma subcapitate. *Capsule* completely 2-celled, or nearly so, circumsciss near the apex. *Seeds* very many, compressed, scrobiculate; embryo peripheric.—Species 9; European, and extending to Central Asia.

1. **H. niger**, *Linn.*; *Boiss. Fl. Orient.* iv. 295; cauline leaves sessile ovate or oblong sinuate or lobed, flowers subsessile, calyx softly hairy teeth mucronate, corolla 1 in. lurid reticulate-nerved. *Wall. Cat.* 2636, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 237; *Nees in Trans. Linn. Soc.* xvii. 77; *Bot. Mag.* t. 2394; *Dunal in DC. Prodr.* xiii. pt. i. 546; *Bentl. & Trimen Med. Pl.* t. 196. H. agrestis, *Kitaibel*; *Sweet Fl. Gard.* t. 27. H. persicus, *Buhse Reise Transkauk.* 158.

Temperate Western Himalaya, alt. 8–11,000 ft., from Kashmir to Gurwhal; frequent.—Distrib. Europe, W. & N. Asia.

Pubescent and more or less hairy. *Leaves* 5 by 2 in. Lower *pedicels* in fruit scarcely $\frac{1}{8}$ in. *Calyx* in flower $\frac{2}{3}$ in., teeth short, triangular; in fruit 1 by $\frac{1}{2}$ in., subcontracted in the middle, teeth somewhat rigid. *Corolla* purple in the base, limb lurid green, purple-veined *Capsule* $\frac{1}{2}$ in. diam. *Seeds* $\frac{1}{24}$ in. diam.

2. **H. pusillus**, *Linn.*; *Boiss. Fl. Orient.* iv. 294; cauline leaves petioled ovate or oblong sinuate or lobed, flowers subsessile, calyx striate glabrescent teeth lanceolate mucronate, corolla $\frac{1}{2}$–$\frac{3}{4}$ in. not reticulate. *Dunal in DC. Prodr.* xiii. pt. i. 550; *Jaub. & Spach Ill.* v. t. 414.

WESTERN TIBET; Ladak; alt. 10,000 ft., *Thomson.*—DISTRIB. From Egypt to Persia and the Altai.

About a foot high, pubescent, somewhat viscid. *Leaves* 3–5 by 1–2 in., very irregularly lobed or subentire; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. Lower *pedicels* in fruit sometimes nearly $\frac{1}{4}$ in., usually very short. *Calyx* $\frac{1}{4}$ in.; in fruit $\frac{3}{4}$–1 in., funnel-shaped, ribbed, somewhat reticulated, glabrous or sparsely viscid pubescent, teeth $\frac{1}{4}$ in., almost prickly, patent. *Corolla* yellow, purple in the base. *Capsule* $\frac{1}{4}$ in. *Seeds* even smaller than in *H. niger*.

3. **H. muticus**, *Linn. Mant.* 45; cauline leaves petioled ovate or oblong entire or toothed, lower flowers pedicelled, calyx striate pubescent teeth short triangular not acute in fruit, corolla 1–$1\frac{1}{4}$ in. lurid yellow or nearly white. *Jaub. & Spach Ill.* v. t. 415; *Boiss. Fl. Orient.* iv. 293. H. Datora, *Forsk. Fl. Æg.-Arab.* 45. H. betæfolius, *Lamk. Dict.* iii. 329. H. insanus, *Stocks in Hook. Kew Journ.* iv. 178. H. angulatus, *Griff. Ic. Pl. Asiat.* t. 412. Scopolia mutica, Datora and Bovena, *Dunal in DC. Prodr.* xiii. pt. i. 552, 553.

WEST PUNJAB; *Thomson.* SCINDE; *Stocks.*—DISTRIB. Cabul, westwards to Egypt.

Stem 1–3 ft. *Leaves* 4–7 in., pubescent or somewhat woolly; petiole $\frac{1}{4}$–3 in. Lower *pedicels* in fruit $\frac{1}{4}$–1 in. *Calyx* $\frac{2}{3}$ in.; in fruit 1 by $\frac{1}{2}$ in., funnel-shaped, ribbed, somewhat reticulate, villous or ultimately glabrous; teeth short-triangular, not spreading. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* $\frac{1}{24}$ in. diam.

10*. NICOTIANA, *Linn.*

Erect, viscidly-pubescent, herbs, shrubs, or trees. *Leaves* entire or sinuate. *Panicles* terminal, or racemes compound, subterminal. *Calyx* ovoid or tubular, 5-fid. *Corolla* funnel-shaped; lobes 5, induplicate in bud. *Stamens* attached in the lower part of the corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. *Ovary* 2-celled; style filiform, stigma shortly 2-fid. *Capsule* 2-, rarely sub-4-, celled, 2-valved to the middle, valves often again splitting. *Seeds* very many, small, scarcely compressed; embryo nearly straight. —Species 35; American, Australian, and Polynesian.

1. **N. Tabacum**, *Linn.*; *Gaertn. Fruct.* i. 264, t. 55; leaves large oblong or elliptic base cuneate, corymb compound ultimate branches short, calyx-teeth triangular-lanceolate, corolla linear-funnel-shaped, capsule $\frac{3}{4}$ in. *Lamk Ill.* t. 113; *Wall. Cat.* 2645; *Nees in Trans. Linn. Soc.* xvii. 76; *Wight Ill.* t. 166 *bis*; *Dunal in DC. Prodr.* xiii. pt. i. 557; *Bentl. & Trimen Med. Pl.* t. 191.

Throughout INDIA, cultivated.—DISTRIB. Native in America; cultivated in all warm countries.

Tobacco, though cultivated in nearly every village in Bengal, shows little tendency to spread as a weed. In Cochin China and the Moluccas, Louveirs and Rumphius say it has been known from a remote period.

2. **N. rustica**, *Linn.*; *Dunal in DC. Prodr.* xiii. pt. i. 563; leaves ovate base obtuse or cordate, panicle close, calyx-teeth triangular subobtuse, corolla cylindric campanulate, berry $\frac{1}{2}$ in. *Reich Ic. Fl. Germ.* t. 1626, fig. 1.

W. PUNJAB; cultivated, *Falconer.*—DISTRIB. Native of Mexico; cultivated in Europe, Asia, Africa, and America.

3. **N. plumbaginifolia**, *Viv.*; *Dunal in DC. Prodr.* xiii. pt. i. 569; leaves oblong or elliptic base narrowed, corymb-branches elongated forming very lax racemes, calyx-teeth triangular-lanceolate acuminate, corolla narrow-linear, capsule ¼ in. N. crispa, *Pers.*; *Jacq. Fragm.* t. 84.

BENGAL, a common introduced weed.—DISTRIB. Native of Mexico and the W. Indies.

The only species of *Nicotiana* that has established itself in India.

ORDER CIII. **SCROPHULARINEÆ.** (By J. D. Hooker.)

Herbs or shrubs, rarely trees. *Leaves*, all, or the lower only, opposite, rarely all alternate or whorled; stipules 0. *Inflorescence* centripetal or composite; flowers usually irregular. *Calyx* inferior, usually persistent, 5- rarely 4-merous. *Corolla* hypogynous, 4–5-lobed. *Stamens* usually 4, with a rudimentary 5th, rarely 2 or 5; anthers 1–2-celled, cells distinct, or more or less confluent. *Disc* annular, glandular, or cup-shaped. *Ovary* 2-celled (very rarely 1-celled) (*Lathræa*); style simple; stigma capitate, dilated, 2-lobed, or 2-lamellate; ovules many, rarely 2, in each cell, anatropous or amphitropous. *Fruit* capsular, rarely baccate; placentas on a free central axis, or remaining attached to the margins of the valves. *Seeds* small, various in form, hilum lateral or ventral, albumen fleshy (0 in *Wightia*); embryo straight or curved.—DISTRIB. Species about 2000, native of all regions.

In this Order I have departed from the "Genera Plantarum" in introducing *Lathræa* under the Tribe *Euphrasieæ*, instead of retaining it in *Orobancheæ*. This, its proper position, was pointed out by Solms Laubach, in a dissertation which was overlooked when the *Scrophularineæ* of the "Genera" were elaborated. I have also transferred *Campbellia* to *Christisonia*, which is left in *Orobancheæ* till the living plant shall be studied morphologically.

A few non-Indian garden *Scrophularineæ* are more or less frequent near stations, but none seem truly naturalised to any extent except the American *Calceolaria mexicana*, Benth., which is so about Darjeeling and in the Nilgherries.

SERIES A. **Pseudosolaneæ.** *Leaves all alternate. Inflorescence simply centripetal. Corolla with the 2 upper lobes exterior in bud.*

TRIBE I. **Aptosimeæ.** *Corolla-tube* elongate.

Stamens 2. Viscid herbs . . . . 1. ANTICHARIS.

TRIBE II. **Verbasceæ.** *Corolla* subrotate.

Stamens 5 . . . . 2. VERBASCUM.
Stamens 4 . . . . 3. CELSIA.

SERIES B. **Antirrhinideæ.** *Leaves, at least the lower, usually opposite. Inflorescence centripetal or composite, partial ones centrifugal. Corolla with the 2 (free or connate) upper lobes exterior in bud. Stamens 2 or 4, very rarely 5 perfect.*

TRIBE III. **Antirrhineæ.** *Corolla* tubular, tube saccate or spurred. *Capsule* opening by pores. *Inflorescence* uniform, centripetal.

Corolla spurred. Anther-cells distinct . . . . 4. LINARIA.
Corolla small, subsaccate. Anther-cells confluent above . 5. SCHWEINFURTHIA.
Corolla large, saccate below. Anther-cells distinct . . . 6. ANTIRRHINUM.

TRIBE IV. **Cheloneæ.** *Corolla* tubular, not saccate nor spurred. *Anther-cells* confluent. *Fruit* capsular or baccate. *Inflorescence* compound.

Herbs. Calyx deeply 5-fid. Capsule septicidal . . . . 7. SCROPHULARIA.
Shrubs. Calyx 5-toothed. Anthers bearded. Capsule loculicidal . . . . 8. BRANDISIA.
A tree. Calyx 3–4-lobed. Anthers glabrous. Capsule septicidal . . . . 9. WIGHTIA.

TRIBE V. **Manuleæ.** *Corolla* tubular, not saccate nor spurred. *Anther-cells* divaricate, confluent. *Fruit* capsular. *Inflorescence* centripetal, uniform.

Viscid herb. Calyx 5-partite . . . . 10. SUTERA.

TRIBE VI. **Gratioleæ.** *Corolla-tube* not saccate nor spurred; lobes flat. *Anther-cells* distinct. *Fruit* capsular, rarely indehiscent. *Inflorescence* uniform.

SUBTRIBE I. MIMULEÆ. *Calyx* 5-toothed or -fid. *Stamens* included; anther-cells contiguous. *Capsule* loculicidally 2–4-valved, or indehiscent.

Flowers axillary or the upper racemed. Capsule 2-valved . 11. MIMULUS.
Flowers in subsecund racemes. Capsule 2-valved . . . 12. MAZUS.
Flowers few, racemed. Fruit indehiscent, globose . . . 13. LANCEA.

SUBTRIBE II. STEMODIEÆ. *Calyx* 5-partite, except *Lindenbergia*. *Stamens* 4, included; anther-cells separate.

Calyx campanulate, 5-fid. Capsule 2-valved . . . . . 14. LINDENBERGIA.
Calyx-segments unequal. Stamens 4, 2 or all with one imperfect anther-cell . . . . 15. ADENOSMA.
Calyx-segments equal. Stamens all perfect. Seeds terete 16. STEMODIA.
Calyx-segments equal. Stamens all perfect. Seeds angled 17. LIMNOPHILA.

SUBTRIBE III. HERPESTIDEÆ. *Calyx* 5-partite, imbricate. *Stamens* included; anther-cells contiguous. *Capsule* 2–4-valved.

Calyx-segments unequal. Stamens 4 . . . . 18. HERPESTIS.
Stamens 2. Valves of capsule with inflexed margins. No radical leaves . . . . 19. GRATIOLA.
Stamens 2. Valves of capsule not inflexed. Leaves radical 20. DOPATRIUM.

SUBTRIBE IV. VANDELLIEÆ. *Calyx* usually 5-toothed or -partite. *Stamens* 2 upper, usually in the tube, 2 lower in the throat of the corolla, perfect, or reduced to staminodes; anthers conniving or cohering in pairs.

Calyx-segments 5, broad. Stamens 4, all perfect . . . . 21. ARTANEMA.
Calyx flat, segments 4, 2 outer very large . . . . . . 22. CURANGA.
Calyx tubular, plaited or winged, obliquely 3–5-toothed or 2-lipped . . . . 23. TORENIA.
Calyx-segments 5, free or connate. Stamens 4, all perfect 24. VANDELLIA.
Calyx-segments 5, narrow. Stamens 2, both perfect. Capsule short . . . . 25. ILYSANTHES.
Calyx-segments 5, narrow. Stamens 2, both perfect. Capsule long . . . . 26. BONNAYA.

SUBTRIBE V. LIMOSELLEÆ. *Calyx* 3–5-toothed or -partite. Two lower *stamens*, perfect, upper 0, or reduced to staminodes; or stamens 3-4, subequal. —Minute and minute-flowered marsh-herbs; flowers usually solitary.

Sepals 4, very long and slender. Anther-cells 2, parallel . 27. BYTHOPHYTON.
Calyx tubular, 5-fid. Anther-cells confluent. Leaves opposite, narrow . . . . 28. MICROCARPÆA.

Calyx tubular, 5-toothed. Anthers 1-celled. Leaves opposite, broad, fleshy . . . . 29. PEPLIDIUM.
Calyx shortly 3–4-lobed. Anther-cells confluent at the tips. Leaves opposite, fascicled . . . . 30. GLOSSOSTIGMA.
Calyx 5-toothed. Stamens 4. Anther-cells confluent. Leaves and pedicels radical . . . . 31. LIMOSELLA.

SERIES C. **Rhinanthideæ.** *Leaves various. Inflorescence usually centripetal or composite. Corolla-lobes variously imbricate, anterior or lateral usually the outer in bud. Stamens 2 or 4, the 5th very rarely present.*

TRIBE VII. **Digitaleæ.** *Corolla-lobes* all flat, usually spreading, the lateral, or one of them, exterior in bud. *Anther-cells* usually confluent at the tip and spreading below, rarely wholly confluent.—Herbs. *Leaves* various. *Inflorescence* simply centripetal.

SUBTRIBE I. SIBTHORPIEÆ. *Corolla* subrotate, lobes 4–5 or more. *Stamens* as many as the lobes, or fewer by one, equal; anthers sagittate or horseshoe-shaped.

Calyx 4–8-fid. Corolla 5–8-fid. Creeping herbs . . . . 32. SIBTHORPIA.
Calyx 5-partite. Corolla 5-fid. Creeping herb, leaves dimorphic . . . . 33. HEMIPHRAGMA.
Calyx 4–5 partite. Corolla 4-fid. Erect herb . . . . 34. SCOPARIA.

SUBTRIBE II. EUDIGITALEÆ. *Corolla-tube* elongate, ventricose above or below. *Stamens* 4, didynamous, or 2; anther-cells confluent at the tips or wholly.

Leaves alternate, linear. Raceme terminal. Stamens 2 . 35. CAMPYLANTHUS.

SUBTRIBE III. VERONICEÆ. *Corolla* rotate or tube campanulate or cylindric, 4–5-lobed. *Stamens* 2 or 4, exserted (or included in *Wulfenia*), equal; anthers distant; anther-cells parallel or divergent, tips confluent.—Leaves alternate or radical.

Flowers dimorphic. Stamens 4. Leaves radical . . . . 36. PICRORHIZA.
Corolla-tube cylindric. Stamens 4. Leaves subradical . 37. WULFENIA.
Corolla-tube incurved. Stamens 2. Leaves alternate . . 38. CALORHABDOS.
Corolla-tube short. Stamens 2. Leaves (or the lower) opposite . . . . 39. VERONICA.

TRIBE VIII. **Gerardieæ.** *Corolla-lobes* all flat, spreading, 2 upper usually interior in bud. *Anther-cells* distinct throughout, bases often mucronate, equal or one imperfect or wanting.—Usually root-parasites, turning black when dry.

SUBTRIBE I. ESCOBEDIEÆ. *Calyx-lobes* valvate. *Anthers* 2-celled.—Leafy herbs, rarely shrubs.

Calyx campanulate. Corolla oblique. Spikes bracteate . 40. ALECTRA.

SUBTRIBE II. BUCHNEREÆ. *Calyx* tubular or subcampanulate. *Corolla-tube* slender, limb spreading. *Anthers* 1-celled, cell narrow, tip usually mucronate.—Leafy herbs; lower leaves opposite.

Calyx tubular, 5-toothed. Corolla-tube straight or subcurved . . . . 41. BUCHNERA.
Calyx tubular, 5-toothed. Corolla-tube abruptly incurved 42. STRIGA.
Calyx subcampanulate, 5-fid. Corolla-tube straight or curved . . . . 43. RAMPHICARPA.

SUBTRIBE III. EUGERARDIEÆ. *Calyx* various. *Corolla-tube* short or broad, rarely slender; limb spreading, upper lobes interior in bud. *Anther-cells* equal, or one smaller and imperfect.—Herbs or shrubs. Leaves all, or the lower, opposite.

Calyx spathaceous, compressed . . . . 44. CENTRANTHERA.
Calyx campanulate, 5-toothed. Anthers with one cell stipitate and empty . . . . 45. SOPUBIA.
Calyx campanulate, 5-toothed. Anther-cells subequal. Ovary many-ovuled . . . . 46. MICRARGERIA.
Calyx tubular-campanulate. Anther-cells equal. Ovary 4-ovuled . . . . 47. LEPTORHABDOS.

TRIBE IX. **Euphrasieæ.** *Corolla* 2-lipped, upper lip erect, concave or hooded, interior in bud; lower usually spreading. *Anther-cells* distinct, bases usually mucronate.—Herbs, often parasitic, black when dry. *Leaves* opposite or alternate. *Inflorescence* centripetal.

* *Cells of ovary more than 2-ovuled. Margins of upper lip of corolla reflexed.*

Seeds numerous, ovoid, reticulate. Flowers axillary . . . 48. PHTHEIROSPERMUM.
Seeds numerous, oblong, striate. Flowers spicate . . . 49. EUPHRASIA.
Seeds numerous, ellipsoid . . . . 50. EMMENOSPERMUM.

** *Cells of ovary more than 2-ovuled. Margins of hood of corolla straight.*

Calyx 4-toothed or 4-fid. Leaves opposite . . . . 51. BARTSIA.
Calyx split in front, 2–5-toothed. Leaves alternate or whorled . . . . 52. PEDICULARIS.
Leaves 0 . . . . 53. LATHRÆA.

*** *Cells of ovary 2-ovuled.*

Upper tip of corolla compressed. Leaves opposite . . . 54. MELAMPYRUM.

GENUS OF DOUBTFUL POSITION (NEAR *Wulfenia*?).

Sepals 5. Corolla-tube long. Stamens 4, didynamous, included; anthers peltate, cells confluent . . . . 55. OREOSOLEN.

TRIBE I. APTOSIMEÆ.

1. ANTICHARIS, *Endl.*

Erect, small, annual, viscid herbs. *Leaves* alternate, quite entire. *Flowers* axillary, solitary. *Sepals* narrow, subvalvate. *Corolla-tube* long, dilating into the throat; lobes 5, flat, subequal. *Stamens* 2 lower perfect; anthers transverse, curved; staminodes 0. *Style* filiform, stigma obtuse or notched. *Capsule* ovoid or oblong, acuminate, loculicidal and septicidal; valves with inflexed margins separating from the axis. *Seeds* numerous, minute, ellipsoid, striate; embryo straight.—Species 4, Tropical and S. African, Oriental, and Indian.

1. **A. glandulosa,** *Aschers. in Bericht. Akad. Wiss. Berl.* 1866, 880; densely glandular-hispid, leaves oblong or ovate obtuse, pedicels equalling the calyx or shorter, corolla glabrous, sepals three-fourths as long as the capsule. *Boiss. Fl. Orient.* iv. 423. Distemon glandulosus, *Ehrb. & Hempr. mss.*

SCINDE, *Stocks, Vicary.*—DISTRIB. Upper Egypt.

A foot high, or less, leafy. *Leaves* ½–1 in., narrowed into a short petiole. *Flowers*

in all the axils. *Corolla* $\frac{1}{3}$ in. long, rosy. *Anthers* narrow, 1-celled, glabrous. *Capsule* $\frac{1}{3}$ in., hispid.—Very near *A. arabica*, Endl.

2. **A. linearis,** *Hochst. in Schimp. Pl. Nub.*; viscidly pubescent, leaves linear acute, pedicels capillary much longer than the calyx, corolla pubescent, sepals about half as long as the capsule. *Aschers. in Bericht. Akad. Wiss. Berl.* 1866, 883; *Boiss. Fl. Orient.* iv. 423. Doratanthera linearis, *Benth. in DC. Prodr.* x. 347. Distemon angustifolius, *Ehrb. & Hempr. mss.*

PUNJAB PLAIN, *Thomson, Edgeworth.* SCINDE, *Stocks.*—DISTRIB. Westward through Arabia and Tropical Africa to the Cape de Verde Islds.

Usually more slender than *A. glandulosa*. *Leaves* 1–1$\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{10}$ in. *Flowers* in all the axils. *Corolla* nearly $\frac{1}{2}$ in. long, rosy. *Anthers* short, 2-celled, hairy. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous.

TRIBE II. VERBASCEÆ.

2. VERBASCUM, *L.*

Erect, tomentose or woolly, usually tall herbs. *Leaves* all alternate. *Flowers* in simple or panicled terminal racemes or spikes, ebracteate, yellow, rarely white or red. *Calyx* 5-lobed or -partite, lobes imbricate. *Corolla* rotate; lobes 5, broad, the upper exterior in bud. *Stamens* 5 (very rarely 4), filaments all or the three upper bearded; anthers transverse or oblique, cells confluent. *Style-top* dilated, stigma simple. *Capsule* globose, oblong, or ovoid, septicidal; valves separating from the axis. *Seeds* numerous, rugose, not winged; embryo straight.—Species about 100; chiefly Mediterranean and Oriental.

V. virgatum, With. (*Wight Ill.* 165, *bis.* f. 1, and *Ic.* t. 1404. Celsia viscosa, *Wight Cat.* n. 1599, and *Nees in Trans. Linn. Soc.* xvii. 81, *in part, not of Roth*), a West European species, occurs in the Nilgherries, doubtless as a garden escape.

1. **V. Thapsus,** *Linn.*; *Benth. in DC. Prodr.* x. 225; densely woolly, eglandular, stem simple, leaves oblanceolate very decurrent entire or crenate, flowers in a simple dense woolly spike. *Boiss. Fl. Orient.* iv. 301; *Roxb. Fl. Ind.* i. 461. V. indicum, *Wall. Cat.* 2630, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 236; *Nees in Trans. Linn. Soc.* xvii. 79. ? V. Blattaria, *T. A. Schmidt in Trimen Journ. Bot.* 1868, 243, *not of Linn.*

TEMPERATE HIMALAYA, alt. 6–11,000 ft.; from Kashmir to Bhotan. WESTERN TIBET; Ladak, *Thomson.*—DISTRIB. Westwards to Britain.

Stem stout, 2–3 ft. *Root-leaves* 6–18 in., cauline oblong, upper acuminate. *Spike* 6–10 in.; bracts longer than the flowers. *Stamens* 5, fertile, 2 glabrous and 3 with white hairs.—As this is the only common Himalayan species, it must be that referred to as *V. Blatteria* by T. A. Schmidt.

VAR. *thapsiforme*; bracts very long. V. thapsiforme, *Schrad.*; *Boiss. l.c.* 301. V. cuspidatum, *Schrad.*; *T. A. Schmidt in Trimen Journ. Bot.* 1868, 243.

2. **V. celsioides,** *Benth. in DC. Prodr.* x. 229; glandular-pubescent, lower leaves pinnatisect, upper auricled cordate acuminate, flowers racemose.

KUMAON; at the foot of the hills, *Edgeworth.* The PUNJAB; at Hussan, *Aitchison.*

Stem 2–3 ft. *Leaves* 4–6 in., sessile or petioled, irregularly toothed and lobulate. *Flowers* in a long loose raceme; bracts ovate-lanceolate; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* oblong, obtuse. *Corolla* $\frac{1}{2}$ in. diam. *Stamens* 4–5; filaments woolly.—This species, being sometimes tetrandrous, unites *Verbascum* with *Celsia*.

3. CELSIA, *L.*

Characters of *Verbascum*, but stamens 4 (see also *V. celsioides*).

1. **C. coromandeliana,** *Vahl Symb.* iii. 79; finely pubescent or tomentose, glandular above, root-leaves petioled lyrate-pinnatifid, cauline sessile oblong-ovate toothed, racemes simple or panicled, sepals entire or toothed. *Benth. in DC. Prodr.* x. 246; *Roxb. Fl. Ind.* iii. 100; *Wall. Cat.* 2631; *Wight Ill.* t. 165, *bis* f. 1, *right hand*, and *Ic.* t. 1406; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 358. C. viscosa, *Roth Catal. Bot.* ii. 69, and iii. 50; *Wight in Hook. Journ. Bot.* i. (1834) 228, t. 129; *Nees in Trans. Linn. Soc.* xvii. 81, *in part.*

Throughout INDIA; from the Punjab to Ceylon and Pegu, ascending to 5000 ft.—DISTRIB. Affghanistan, Ava, China.

Annual. *Stem* 2–3 ft., stout or slender. *Leaves* 2–4 in., the large terminal lobe usually oblong, obtuse, toothed. *Raceme* 1–2 ft.; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in.; bracts ovate, shorter. *Sepals* oblong or ovate. *Corolla* $\frac{1}{2}$ in. diam., yellow. *Filaments* all hairy. *Capsule* subglobose, $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

4. LINARIA, *Juss.*

Herbs. *Leaves* usually opposite, or whorled below and alternate above. *Flowers* axillary, racemose or spicate, ebracteolate. *Sepals* 5, imbricate. *Corolla-tube* spurred in front; upper lip erect, 2-lobed; lower spreading, 3-lobed, throat usually closed by the tumid palate. *Stamens* 4, didynamous, ascending, included; anther-cells distinct, parallel. *Style* filiform, stigma minute. *Capsule* ovoid or globose, 2-celled, each cell or the anterior only opening by an apical pore. *Seeds* numerous, polymorphous.—Species 130, almost exclusively natives of the temperate regions of the old world.

L. striata, DC., a Mediterranean species, has been found in the Khasia Mts. (near Churra), by Clarke, no doubt an escape. *L. triphylla*, Mill., a plant of the same region, also occurs in India according to Bentham (in DC. Prodr. x. 274), but I have seen no specimen.

* *Sepals narrowly lanceolate.*

1. **L. ramosissima,** *Wall. Pl. As. Rar.* ii. 43, t. 153, and *Cat.* 3911; perennial, nearly glabrous, branches prostrate slender, leaves alternate petioled ovate-cordate, or lower 6–7-lobed triangular-hastate and upper lanceolate sagittate, pedicels capillary longer than the petiole, spur shorter than the corolla-tube, seeds scabrous. *Benth. in DC. Prodr.* x. 270; *Wight Ill.* t. 165; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 368. L. Roylei, *Chavannes Monogr. Antirrh.* 112.

Throughout INDIA, on rocks and stony places, from the Punjab and Scinde to Chittagong and CEYLON; ascending the hills to 5000 ft. DISTRIB. Affghanistan, Ava.

Branches numerous, filiform, spreading from the rootstock. *Leaves* membranous, $\frac{1}{2}$–2 in., extremely variable. *Flowers* yellow; pedicels 1–1$\frac{1}{2}$ in. *Sepals* lanceolate. *Corolla* $\frac{1}{2}$ in. long, spur short, tube hairy, upper lip short. *Capsule* with subequal lobes. *Seeds* minute, ovoid.—The var. *ovata*, Benth., with all the leaves ovate-cordate, passes so insensibly into the type that it cannot be retained.

VAR. *pubescens*, Stocks ms.; softly hairy, corolla rather larger and spur rather longer.—This in hairiness resembles *L. cabulica*.

2. **L. cabulica,** *Benth. in DC. Prodr.* x. 270; perennial, softly hirsute, branches prostrate slender, leaves alternate petioled lower ovate subhastate

and lobed, upper lanceolate sagittate, pedicels rigid longer than the leaves, spur longer than the corolla-tube, seeds scabrous. *Boiss. Fl. Orient.* iv. 368.

The PUNJAB, SCINDE and WESTERN HIMALAYA, ascending to 6000 ft., and eastward to Kamptee, *Wight,* and Rotas in BEHAR, *J. D. H.* DISTRIB. Westwards to Persia.

More rigid than *L. ramosissima,* with smaller more entire leaves, and shorter petioles.

3. **L. incana,** *Wall. Pl. As. Rar.* ii. 43; perennial, villous, branches prostrate, leaves ovate or hastate, petiole very short, pedicels rigid often exceeding the leaves, spur much shorter than the corolla-tube, seeds closely roughly pitted.

WESTERN AND CENTRAL HIMALAYA; from Kashmir, alt. 5,500, *Falconer,* &c., to Nepal, *Wallich.*

Habit of *L. cabulica,* but with much larger flowers and capsules, and larger, very different seeds.

** *Sepals linear-spathulate.*

4. **L. minor,** *Desf.*; *Benth. in DC. Prodr.* x. 287; annual, erect, glandular-pubescent, leaves mostly alternate oblong or obovate, pedicels slender, spur shorter than the corolla-tube, seeds oblong truncate ribbed smooth. *Boiss. Fl. Orient.* iv. 383. Antirrhinum minus, *Linn.*; *Gaertn. Fruct.* i. 249 to 53.

The PUNJAB PLAIN; *Vicary, Aitchison.* DISTRIB. Westwards to Britain.

Stem 6–18 in., branches ascending. *Leaves* ½–1 in. obtuse, narrowed into the petiole. *Peduncles* axillary, often exceeding the leaves. *Sepals* enlarging after flowering, nearly equalling the pale purple corolla with a yellow depressed palate. *Capsule* gibbous at the base; cells subequal, opening by ragged pores.

5. SCHWEINFURTHIA, *A. Braun.*

Annual or perennial branched glabrous herbs. *Leaves* nearly always alternate, quite entire. *Flowers* small, axillary. *Sepals* imbricate, the upper largest. *Corolla-tube* subacute; upper lip erect, 2-lobed; lower reflexed 3-lobed; palate closing the throat. *Stamens* 4, didynamous, 5th rudimentary; anther-cells diverging. *Style* filiform, stigma minute. *Capsule* subglobose, fragile, anterior cell many-seeded, bursting irregularly; posterior very small, 3–4-seeded or empty. *Seeds* obconic, 5-winged, furrowed between the ribs.—Species 3, N.E. African and oriental.

1. **S. sphærocarpa,** *A. Braun in Monatsb. Akad. Wiss. Berl.* 1866, 875; robust, glabrous or hairy, leaves orbicular obovate or spathulate fleshy glaucous, pedicels very short, sepals ovate or lanceolate acute. S. papilionacea, *Boiss. Fl. Orient.* iv. 387. Antirrhinum papilionaceum, *Burm. Fl. Ind.* 121, t. 39, f. 2. A. glaucum, *Stocks in Wight Ic.* t. 1459. Linaria sphærocarpa, *Benth. in DC. Prodr.* x. 287.

SCINDE; in rocky places; *Stocks, Vicary.* DISTRIB. Beloochistan and Affghanistan.

Perennial; branches 6–12 in. *Leaves* ¼–1½ in., obtuse or subacute, narrowed into the short petiole. *Sepals* ⅛ in. long, equalling the corolla-tubes, enlarged in fruit. *Corolla* dirty-white. *Filaments* hairy at the base. *Capsule* ¼–⅓ in. diam. *Seeds* pale.—Sunpât of druggists.

6. **ANTIRRHINUM,** *Linn.*

Annual or perennial herbs. *Leaves* entire or lobed, lower opposite, upper alternate. *Flowers* solitary and axillary or racemed. *Sepals* 5, imbricate. *Corolla* compressed, base saccate; upper lip erect, 2-lobed; lower spreading, 3-lobed; palate broad, bearded, closing the throat. *Stamens* 4, didynamous; anther-cells distinct, parallel. *Style* filiform, stigma 2-lobed. *Capsule* ovoid or globose; cells many-seeded, anterior opening by one pore, posterior by 2 toothed pores, or both opening by one pore. *Seeds* minute, oblong, truncate, rugose or pitted.—Species 25, of northern temperate regions.

The common Snapdragon (*A. majus, L.*) is stated (*Benth. in DC. Prodr.* x. 291) to be subspontaneous in India, but I have seen no specimens.

1. **A. Orontium**, *Linn.*; *Benth. in DC. Prodr.* x. 290; annual or biennial, slender, erect, leaves linear, flowers axillary subsessile, sepals longer than the corolla. *Boiss. Fl. Orient.* iv. 385. A. gibbosum, *Wall. Pl. As. Rar.* ii. 44, and *Cat.* 3854.

PUNJAB PLAIN and WESTERN HIMALAYA, ascending to 4000 ft. (an escape in the Nilgherries).—DISTRIB. Westwards to N. Africa and Britain.

Annual or biennial.

Stem 6–18 in., usually glabrous below and glandular above, branched from the base. *Leaves* 1–2 in., very narrow, rarely oblong-lanceolate. *Flowers* ½–⅔ in., rose-purple. *Sepals* very narrow, spreading. *Capsule* ⅓ in., pubescent. *Seeds* compressed, face concave, back keeled, margins thickened.

7. **SCROPHULARIA,** *L.*

Annual or perennial, often fœtid herbs. *Leaves* opposite or the upper alternate, often pellucidly dotted. *Flowers* in panicled or thyrsoid cymes, greenish-purple or yellow. *Sepals* 5. *Corolla-tube* globose or ovoid, tumid; lobes 5, short, flat; 4 upper erect, lower spreading. *Stamens* 4, declinate, didynamous, 5th rudimentary or 0; anther-cells adnate to the filament, confluent, bursting transversely. *Disc* oblique. *Style* slender, stigma notched. *Capsule* ovoid, acute or beaked, septicidal. *Seeds* many or few, ovoid, more or less rugose.—Species about 120, of northern temperate regions.

* *Cymes contracted, dense-fld. Upper corolla-lobes short, subequal. Stamens included.—Leaves broad, entire, ovate or ovate-cordate, petiole not appendaged, nerves distinct.*

1. **S. pauciflora**, *Benth. Scroph. Ind.* 17, and in *DC. Prodr.* x. 302; glabrous or sparsely pubescent, leaves long-petioled ovate-cordate coarsely toothed, flowers crowded in distant leafless cymes, sepals ovate acute shorter than the capsule, stamens included, staminode 0.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 10–13,000 ft., J. D. H., &c.

Stem 2–3 ft., stout, sparingly branched. *Leaves* 2–4 in., primary and secondary nerves distinct; petiole ½–2 in. *Inflorescence* 2–8 in. long, stiff; cymes crowded, shortly peduncled; pedicels ¼ in. and less. *Corolla* green. *Capsule* ¼–⅓ in. long, ovoid, acute. *Seeds* oblong.

2. **S. calycina**, *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 304; glabrous or sparsely pubescent above, leaves shortly petioled ovate or cordate-ovate acute coarsely toothed, flowers crowded in approximate leafless cymes,

sepals lanceolate acuminate, equalling or longer than the capsules. Stamens included, staminode ovate acute. Veronica? thyrsiflora, *Wall. Cat.* 6393.

WESTERN HIMALAYA; from Kashmir, *Royle*, to Kumaon, *Blinkworth*, alt. 6–12,000 ft.

Stem 1–2 ft., stout, sparingly branched. *Leaves* 1–4 in., sometimes oblong, primary and secondary nerves distinct; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Inflorescence* 2–4 in., stiff; cymes very shortly peduncled; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. ovoid, acuminate. *Seeds* oblong.

** *Cymes more or less effuse. Two upper corolla-lobes longer than the others. Stamens included or exserted.—Leaves broad, entire, ovate or ovate-cordate, petiole not appendaged (except in* S. polyantha), *nerves distinct.*

3. **S. urticæfolia**, *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 306; glabrous or sparsely hairy, leaves petioled ovate or cordate-ovate acute coarsely toothed, cymes open lax-fld. long slender, lower peduncles axillary, upper chiefly opposite panicled spreading, calyx-lobes rounded, stamens included. *Wall. Cat.* 3922.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7–9000 ft., J. D. H., &c.

Stem 2–3 ft., rather slender. *Leaves* 2–4 in., primary and secondary nerves distinct; petiole $\frac{1}{2}$–2 in. *Cymes* very slender and lax, lower peduncles 1–3 in.; pedicels divaricate, filiform, bracts very small. *Calyx* hemispheric, cleft half-way down. *Corolla* $\frac{1}{4}$ in. long, greenish-white, 2 posterior lobes longest. *Staminode* obovate. *Calyx-lobes* shorter than the small broadly ovoid acuminate capsule. *Seeds* very minute, broadly oblong, apiculate, broadly furrowed and pitted in the furrows.

4. **S. obtusa**, *Edgew. ms.*; hoary, leaves shortly petioled ovate or ovate-cordate obtuse crenate, cymes open lax-fld. long-peduncled, lower axillary upper chiefly opposite panicled spreading, calyx-lobes rounded, stamens included. *Herb. Strach. & Winterb., Scroph.* n. 3.

WESTERN HIMALAYA; Kumaon at Almora, alt. 6–6,500 ft., *Edgeworth*, &c.

Stem 2–3 ft., branched, and as well as the leaves beneath and inflorescence clothed with a fine hoary pubescence. *Leaves* 2–3 in., dull-green, primary nerves only distinct; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Cymes* longer or shorter than the leaves; peduncles stout, strict; pedicels also stout, divaricate, sometimes 1 in. long. *Calyx* cleft more than halfway down; lobes nearly equalling the small subglobose capsule. *Corolla* yellowish, tube twice as long as the calyx; two upper lobes longest. *Staminode* orbicular. *Seeds* very minute, as in *S. urticæfolia.*

5. **S. Scopolii**, *Hoppe*; *Benth. in DC. Prodr.* x. 308; glabrous or sparsely pubescent, leaves petioled ovate oblong or cordate-ovate coarsely irregularly toothed or sublaciniate, cymes lax-fld. all erect lower axillary, upper alternate in long strict narrow leafless panicles, peduncles and pedicels short very stout erect, sepals orbicular margins scarious, stamens included. *Reichb. Ic. Pl. Germ.* xx. t. 1675, f. 3. *Boiss. Fl. Orient.* iv. 395. S. glandulosa, *Waldst. & Kit.* iii. t. 214. S. auriculata, *Scop. Fl. Carniol.* i. 446, t. 32, *not of Linn.* S. decumbens, *Fisch. & Mey. in Ann. Sc. Nat.* 3, v. 380.

WESTERN HIMALAYA; Kashmir, Murree and Hazara, alt. 6000 ft.; *Fleming, Clarke.*—DISTRIB. Affghanistan and westwards to Spain.

Stem stout, 2–3 ft., branched, glabrous in Indian specimens. *Leaves* 1–3 in., compoundly toothed or subserrate; petiole $\frac{1}{2}$–1 in. *Cymes* in stiff stout contracted panicles a foot long and upwards. *Corolla* greenish. *Stamens* included; staminode orbicular. *Capsule* ovoid-globose, beaked. *Seeds* rugulose.—A very variable and widely diffused plant. Affghanistan specimens have lobules on the petiole.

6. **S. elatior**, *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 304; tall, glabrous or glandular above, stem 4-winged, leaves petioled ovate or lanceolate coarsely toothed, cymes spreading peduncled many-fld. in long panicles, peduncles and pedicels spreading, sepals ovate subacute, stamens far exserted. *Wall. Cat.* 3928.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–10,000 ft., J. D. H., &c. KHASIA MTS., alt. 4–5000 ft., common.

Tall, very stout, 3–5 ft. high, branched, stem below as thick as the middle finger, wings slender. *Leaves* 5–10 by 1–5 in., rarely subcordate, primary and secondary nerves distinct; petiole stout, 1–3½ in. *Panicle* sometimes much branched from the base, bracts linear; peduncles 1–2 in.; branches and pedicles spreading. *Sepals* not margined, not half the length of the globose-ovoid beaked capsule. *Stamens* twice as long as the corolla; staminode spathulate or 0. *Seeds* as in *S. urticæfolia.*

7. **S. Edgeworthii**, *Benth. in DC. Prodr.* x. 304; glandular-puberulous, stem obtusely 4-angled, leaves petioled ovate-cordate coarsely crenate-toothed, cymes long-peduncled panicled few- and lax-fld. spreading, sepals ovate acute much shorter than the tubular corolla, stamens shortly exserted.

WESTERN HIMALAYA: Gurwhal, at Musa Paria, alt. 12,000 ft., *Edgeworth*; Kumaon, at Sabu, alt. 8,500 ft., *Strach. & Winterb.*

Apparently a tall species. *Leaves* 2–3 in., primary nerves only distinct; petiole 1–1½ in. *Peduncles* and pedicels spreading in fruit; bracts lanceolate; pedicels 1–1½ in. *Sepals* nearly as long as the subglobose capsule. *Corolla* ⅓ in. long. *Staminode* spathulate. *Seeds* very minute, irregular, obscurely ribbed and pitted.—The specimens of this plant are insufficient; Edgeworth's are in flowers only; the Kumaon ones are more advanced and in fruit, are nearly glabrous with a rather shorter corolla.

8. **S. polyantha**, *Royle*; *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 304; glabrous below, viscidly puberulous above, stem obtusely 4-angled, leaves ovate or ovate-cordate crenate, petiole short naked or appendaged, cymes many-fld. suberect or ascending alternate in long leafless thyrsoid panicles, pedicels short, sepals round with broad scarious margins, corolla very short, stamens far exserted. *Wall. Cat.* 9081.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–11,000 ft., common.

Stem 3–4 ft., stout below. *Leaves* 2–8 in., sometimes pinnatifidly cut towards the base, primary-nerves distinct; petiole ½–1 in., rarely more. *Panicle* 1–2 ft., strict; flowers greenish, amongst the smallest of the Indian species. *Sepals* $\frac{1}{10}$ in., half as long as the very broad short corolla, much shorter than the subglobose pointed capsule. *Staminode* spathulate. *Style* filiform. *Seeds* rugulose, larger than in *S. Edgeworthii.*

9. **S. himalensis**, *Royle in Benth. Scroph. Ind.* 18, and *DC. Prodr.* x. 304; glandular-pubescent above, stem obtusely angled, leaves ovate-cordate or lanceolate crenate, petiole long naked, cymes many- and lax-fld. spreading opposite and alternate in a long rather slender panicle, peduncles and pedicels long slender, sepals rounded obscurely margined or not, corolla very short, stamens far exserted.

WESTERN HIMALAYA, from Kunawur to Kumaon, alt. 5–8000 ft., common.

Very near to *S. polyantha*, but the petioles are longer and not appendaged, and the flowers twice as large; the seeds are similar.

*** *Cymes more or less effuse. Two upper corolla-lobes longer than the others. Stamens hardly exserted. Capsules few-seeded. Seeds oblong, deeply pitted or transversely rugose.—Leaves narrow-obovate-spathulate, coarsely toothed or pinnatisect, nerves often very obscure. (The species are perennial, and very difficult to distinguish satisfactorily.)*

10. **S. lucida,** *Linn.*; *Benth. in DC. Prodr.* x. 312; glabrous or glandular pubescent above, leaves 1–2-pinnatisect, segments spreading very unequal oblong ovate or lanceolate incised and serrate, cymes ascending shortly peduncled in long contracted panicles, pedicels short, sepals rounded margin broadly scarious, staminode orbicular or reniform. *Boiss. Fl. Orient.* iv. 403. S. decomposita, *Royle in Benth. Scroph. Ind.* 18, and in *DC. l.c.* 313. S. Griffithii, *Benth. in. DC. l.c.* 312; *excl. var. β*; *Boiss. Fl. Orient.* iv. 410 *excl. syn. Kotschyi.*

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–13,000 ft.—DISTRIB. Kashgar, Affghanistan, and westwards to Italy.

Rootstock stout, perennial, stems 2–3 ft., obscurely 4-angled. *Leaves* 1–2 in., segments horizontal, interrupted. *Cymes* few-fld., lower leafy; peduncles $\frac{1}{2}$–$\frac{3}{4}$ in., pedicels very short; bracts linear. *Sepals* half as long as the corolla, nearly as long as the globose pointed capsule. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ in. broad.—I suspect that this is only a form of *S. canina*, Linn.

11. **S. variegata**, *Bieb. Fl. Taur. Cauc.* ii. 78; glabrous below, glandular above, puberulous, leaves shortly petioled obovate-oblong or spathulate obtuse crenate above incised or pinnatifid toward the base with recurved obtuse lobes, cymes erect or ascending few-fld. alternate in long narrow panicles, pedicels very short, sepals rounded margin broadly scarious, staminode large orbicular or reniform. *Reichb. Ic. Pl. Europ.* iii. 53, t. 257; *Benth. in DC. Prodr.* x. 314. S. depauperata, *Boiss. Diagn. Ser.* iv. 68; and *Fl. Orient.* iv. 410. S. Griffithii, *var. β, Benth. l. c.* 312.

WESTERN HIMALAYA, in the drier regions, and WESTERN TIBET; from Kashmir and the Karakorum to Kumaon, alt. 9–14,000 ft., *Thomson*, &c.—DISTRIB. Asia Minor.

Rootstock perennial; stems 1–2 ft., stout, obtusely 4-angled. *Leaves* 1–2$\frac{1}{2}$ in., coriaceous, contracted into a short broad petiole. *Sepals* about half the length of the corolla and of the small globose pointed capsule. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. long, tube broad.—Probably only a form of *S. lucida*, with more entire leaves. It precisely accords with Reichenbach's figure in all but the greater size.

VAR. ? *tenuicaulis*; branches and panicles very slender, staminode ovate-lanceolate acute.—Kishtwar, alt. 8000 ft., *Thomson.* Kashmir at Srinuggur, alt. 7000 ft., *Clarke.* This is a puzzling plant, probably referable to *S. canina*, L. The habit and foliage are those of *S. variegata.*

12. **S. dentata,** *Royle in Benth. Scroph. Ind.* 19, and in *DC. Prodr.* x. 316; glabrous below, glandular above, nearly black when dry, leaves small petioled obovate-oblong or -spathulate obtuse crenate above, entire or incised towards the base, cymes short erect or ascending few-fld. alternate in narrow panicles, pedicels very short, sepals rounded margins obscurely scarious, staminode small narrow. S. Kotschyi, *Herb. Ind. Or. H. f. & T., not of Boiss.*

WESTERN HIMALAYA, Kumaon, *Royle*, Lahul, *Capt. Hay.* WESTERN TIBET, alt. 12–15,000 ft., *Thomson.*

Very similar to *S. variegata*, but nearly black when dry, with smaller thicker leaves, and a very small staminode. *Rootstock* stout, branches very numerous, 1 foot, cylindric. *Leaves* 1–1$\frac{1}{2}$ in., midrib and nerves very obscure, rather fleshy. *Flowers* smaller than in *S. variegata* or *lucida*. *Capsule* and seeds similar.

13. **S. scabiosæfolia,** *Benth. in DC. Prodr.* x. 313; glabrous or glandular, leaves obovate oblong or subspathulate entire pinnatifid or lobulate, terminal lobe usually large, cymes spreading or ascending alternate rather long few- or many-fld. branches divaricating, flowers very small often spicate, sepals rounded margins scarious, staminode broad. *Boiss. Fl. Orient.* iv. 412.

PUNJAB HILLS, near Peshawur, *Vicary, Aitchison.* WESTERN HIMALAYA and WESTERN TIBET, alt. 10–12,000 ft., *Thomson.*—DISTRIB. Affghanistan.

Rootstock woody, often with many radical petioled pinnatifid or entire obovate or oblong-cordate leaves which are sometimes 5 in. long, and solitary scape-like panicles; thus resembling a *Scabiosa.* In other specimens the stems are slender, 1–2 feet high, and much branched, like those of *S. lucida,* from which the small flowers about $\frac{1}{8}$ in. long, best distinguish it. *S. bicolor,* of Europe, is very near this.—The Beloochistan plant of Stocks referred to it by Boissier may be the same, but it is not in a sufficiently good state for determination.

TRIBE IV. CHELONEÆ.

8. BRANDISIA, *Hook. f. & Thoms.*

Tomentose or scurfy shrubs. *Leaves* opposite, entire. *Flowers* axillary, solitary or 2-nate; pedicels 2-bracteolate. *Calyx* campanulate, 5-toothed. *Corolla-tubes* incurved, dilated above; upper lip broad, concave, erect, broadly 2-lobed; lower spreading, shortly acutely 3-lobed. *Stamens* 4, didynamous, shorter than the corolla, filaments flattened below; anther-cells divergent, margins bearded. *Style* filiform, stigma simple. *Capsule* ovoid, loculicidal, many-seeded, valves separating from the columnar placentiferous axis. *Seeds* linear, testa lax membranous reticulated.—Species 2, a Chinese and the following.

The supposed second species of *Brandisia,* alluded to in the "Genera Plantarum" as a native of Bhotan, has stellate tomentum, lanceolate leaves and a 2-lipped calyx, and cannot be congeneric. It may be a *Wightia,* but the specimens are far too imperfect for determination. The Chinese plant referred to *B. discolor* by Hance, differs in the broad calyx-lobes and corolla; it is *B. Hancei,* H. f.

B. discolor, *H. f. & T. in Journ. Linn. Soc.* viii. 11, t. 4; leaves ovate-lanceolate finely acuminate base rounded or cordate, calyx-teeth subulate. *Kurz For. Fl.* ii. 250, and in *Journ. As. Soc.* 1873, ii. 236.

PEGU, MARTABAN, and TENASSERIM, alt. 3–6000 ft., *Brandis, Parish, Kurz.*

An evergreen half-scandent shrub. *Leaves* 2–3 in., firm, glabrous above, white- or fulvous-tomentose beneath with very prominent nerves, petiole $\frac{1}{4}$ in. *Pedicels* longer than the petiole. *Calyx* $\frac{1}{4}$ in. long, tomentose, 5-ribbed opposite the teeth. *Corolla* $\frac{3}{4}$ in., dull purplish brown, tomentose. *Capsule* ovoid, acute, $\frac{1}{2}$ in. long.

9. WIGHTIA, *Wall.*

A tree. *Leaves* opposite or alternate, quite entire, very coriaceous. *Flowers* in axillary thyrsi, large, rosy, pubescent. *Calyx* campanulate, irregularly 3–5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed; lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved, stigma simple. *Capsule* oblong or ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous broadly winged all round, albumen 0; embryo straight.—Species 3, a Javan, Bornean, and the following.

W. gigantea, *Wall. Pl. As. Rar.* i. 71, t. 81, and *Cat.* 2703; *Benth. in DC. Prodr.* x. 301; *Gamble Cat. Darjeeling Pl.* 58. Gmelina speciosissima, *Don Prodr.* 104; *Schauer in DC. Prodr.* xi. 650.

CENTRAL AND WESTERN HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H., &c.*; Bhotan, *Griffith.*—DISTRIB. Java (*Herb. Horsfield*).

A large tree, often half epiphytic, appressed to and grasping the boles of forest trees by roots given off from the trunk, which is sometimes a foot or more in diameter. *Leaves* 6–12 by 3–6 in., ovate lanceolate rounded or elliptic, acute or obtuse, glabrous above and finally beneath; base acute or rounded; nerves 4–6 pair, oblique; petiole 1–1½ in., stout. *Thyrsi* 4–8 in., erect, narrow; peduncle and rachis very stout; pedicels ¼–½ in., 2-bracteolate in the middle, hoary-pubescent. *Calyx* short, ⅓ in. long and broad, lobes rounded. *Corolla* 1 in. long, mealy. *Stamens* far exserted. *Capsule* ovoid, thinly coriaceous, 1½ in. long by ¾ in. broad; columnar axis entire.—The Javan species alluded to in the "Genera Plantarum" differs in the much longer and woody capsules with the columnar axis 2-partite.

Tribe V. **MANULEÆ.**

10. **SUTERA,** *Roth.*

A low diffuse viscid-pubescent herb. *Leaves* pinnatifid, lower opposite, upper alternate. *Flowers* small, axillary and in terminal racemes; pedicels bracteate, ebracteolate. *Sepals* 5, narrow. *Corolla-tube* slender, throat not dilated; lobes 5, small, 2 upper outer in bud and rather smaller. *Stamens* 4, didynamous, included, filaments filiform. *Style* short, stigma obtuse or notched. *Capsule* ovoid-oblong, septicidal, valves bifid. *Seeds* numerous, testa pitted.

S. glandulosa, *Roth Bot. Bemerk.* 172, and *Nov. Sp.* 291; *Benth. in DC. Prodr.* x. 362; *Boiss. Fl. Orient.* iv. 422; *Wight Ic.* t. 856; *Miquel Fl. Ind. Bat.* ii. 676; S. dissecta, *Walp. Rep.* iii. 271. Capraria dissecta, *Del. Fl. Eg.* i. 95, t. 32, f. 2.

From MARWAR, *Dalzell*, BANDA, *Edgeworth*, BEHAR, *J. D. H.*, and BENGAL, *Griffith*, to the SOUTH DECCAN, *Heyne*, but not common.—DISTRIB. Arabia, Egypt, Nubia.

Annual, branched from the base, branches 6–10 in. long. *Leaves* ¼–½ in., ovate in outline, shortly petioled, segments toothed and cut. *Flowers* axillary all along the branches, sessile or pedicelled, uppermost racemose. *Calyx* ⅛ in. long. *Corolla* nearly white, about twice as long, glabrous. *Capsule* exceeding the calyx.

Tribe VI. **GRATIOLEÆ.**

11. **MIMULUS,** *L.*

Erect prostrate or creeping herbs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* tubular or campanulate, 5-angled, 5-toothed. *Corolla* 2-lipped, upper lip erect or reflexed, 2-lobed; lower spreading, 3-lobed; throat with usually a swollen 2-lobed palate. *Stamens* 4, didynamous; anther-cells divergent, subconfluent. *Style* slender, stigma 2-lamellate. *Capsule* compressed, loculicidal, valves separating from the placentiferous column. *Seeds* numerous, minute, oblong.—Species 40, temperate and tropical.

1. **M. nepalensis,** *Benth. Scroph. Ind.* 29, and in *DC. Prodr.* x. 373; prostrate, glabrous, leaves petioled ovate coarsely serrate, calyx truncate 5-toothed, corolla yellow, capsule included. *Wall. Cat.* 3917; *Maxim. Diagn. Pl. Nov. Dec.* xix. 401. M. assamicus, *Griff. in. Madr. Journ. Nat. Sc.* iv. 3, and *Notul.* iv. 92, and *Ic. Pl. Ind. Asiat.* t. 458, f. 8, 9.

TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Bhotan, *Griffith*. ASSAM, on the banks of the Burrampootra, *Griffith*.—DISTRIB. Japan.

Stems straggling, 6–10 in. long, stout or slender, sometimes faintly hairy. *Calyx*

very variable in length, breadth, and the size of the teeth, which are always small. *Capsule* ovate-lanceolate, included.

VAR. 1; leaves ½–1 in., pedicels usually longer than the leaves, flowers ¾ in. long, fruiting calyx straight.—Nepal, Sikkim, and Assam, alt. 1–6000 ft.

VAR. 2; much larger, leaves 1–1½ in., pedicels shorter than the leaves, flowers 1–1¼ in. long, calyx often curved. ? M. tenellus, *Bunge En. Pl. Chin.* 49 (*Maxim. l. c.*).—Sikkim, alt. 8–12,000 ft.—Possibly a different species, but intermediate forms occur. The calyx varies from ¼ in. long, obconic and straight, to ⅔ in. long subcylindric and curved with an oblique mouth. Miquel's *M. nepalensis*, var. *japonica*, seems the same as this.

2. **M. orbicularis,** *Benth. Scroph. Ind.* 29, and in *DC. Prodr.* x. 373; creeping, glabrous, leaves petioled orbicular nerveless quite entire, calyx small truncate obscurely 5-lobed, capsule exserted. *Wall. Cat.* 3919.

PEGU and TENASSERIM; *Wallich, Griffith, &c.*

Stems rather thick, 6–10 in. *Leaves* ¾–1 in. diam., rather fleshy, base rounded or subacute; petiole ½–¾ in., very thick. *Peduncles* equalling the leaves or shorter, stout or slender. *Calyx* ¼ in., campanulate. *Corolla* ½–⅔ in. *Capsule* ⅓ in., elliptic, acute at both ends; style stout, persistent.

3. **M. gracilis,** *Br. Prodr.* 439; erect, glabrous, leaves sessile linear-oblong quite entire or slightly toothed, calyx shortly 5-lobed, capsule included. *Benth. in DC. Prodr.* x. 594. M. strictus, *Benth. Scroph. Ind.* 28; *Wall. Cat.* 3918.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 1–3000 ft. PUNJAB PLAINS. BENGAL, at Rajmahal, *Wallich.*—DISTRIB. China, Australia, Tropical and S. Africa.

Stout, branched from the base, 6–12 in. high, branches erect. *Leaves* radical and cauline, 1½–2½ in., rather fleshy, ½-amplexicaul, obtuse, blackish when dry. *Peduncles* longer than the leaves, stout. *Calyx* ⅓ in. long, tubular, lobes very small rounded. *Corolla* ½ in. long, white or pale blue. *Capsule* obovoid.

12. **MAZUS,** *Lour.*

Small herbs, often with runners. *Leaves* opposite below or rosulate, above opposite or alternate. *Flowers* small, in terminal subsecund racemes; bracts and bracteoles minute or 0. *Calyx* campanulate, 5-fid. *Corolla-tube* short, upper lip erect, 2-fid; lower much larger, spreading, 3-fid; throat with a 2-lobed palate. *Stamens* 4, didynamous; anther-cells contiguous, diverging. *Stigma* 2-lamellate. *Capsule* included, globose or compressed, obtuse, loculicidal, valves entire. *Seeds* numerous, most minute, ovoid.—Species, 4 Asiatic and 1 Australian.

1. **M. rugosus,** *Lour. Fl. Coch.* 385; runners 0, radical leaves obovate-spathulate crenate narrowed into a short petiole, pedicels mostly ebracteate, calyx-lobes half as long as the tube ovate-lanceolate acute, spreading in fruit. *Benth. in DC. Prodr.* x. 375; *Boiss. Fl. Orient.* iv. 424; *Sweet Brit. Fl. Gard.* t. 36; *Miquel Fl. Ind. Bat.* ii. 677; *Maxim. Diagn. Nov. Pl. Dec.* xix. 403. M. bicolor, *Benth.* in *Wall. Cat.* 3913. M. vandelloides, *Hance*; *Walp. Ann.* iii. 193. Lindernia japonica, *Thunb. Fl. Jap.* 253. Hornemannia bicolor, *Willd. Enum. Hort. Berol.* 654; *Reichb. Icon. Exot.* 25, t. 37. ? Columnea tomentosa, *Roxb. Fl. Ind.* iii. 98. ? Stemodia tomentosa, *G. Don Gen. Syst.* iv. 842. Tittmannia obovata, *Bunge Enum. Pl. Chin.* 279. Vandellia obovata, *Walp. in Act. Acad. Leopold.* xix. *Suppl.* i. 394. Gratiola goodeniæfolia, *Hornem. Hort. Hafn.*

TEMPERATE and SUBTROPICAL HIMALAYA, and Plains of NORTHERN INDIA; from Kashmir to Bhotan, ascending to 7000 ft. KHASIA MTS., alt. 4–6000 ft. BURMA, *Wallich*. UPPER ASSAM, *Griffith*. SOANE RIVER, *J. D. H.*—DISTRIB. Affghanistan, Java, China, Japan, Philippine Islds.

Annual, glabrous or sparsely hairy. Radical *leaves* numerous, 1–3 in. long, including the petiole, which is rarely as long as the blade, coarsely irregularly crenate-toothed. *Flowering-stems* numerous from the root, 2–10 in. long, leafless or with alternate spathulate leaves. *Racemes* 1–6 in., pedicels ¼–½ in. *Calyx* in fruit ¼–⅓ in. diam. *Corolla* ⅓–½ in. long, blue. *Seeds* exceedingly minute, pale.—Roxburgh's *Columnea tomentosa*, referred here by Bentham, can hardly be this.

2. **M. surculosus,** *Don Prodr.* 86; runners rooting with opposite leaves, radical leaves obovate-spathulate coarsely crenate and often subpinnatifid at the base narrowed into a short petiole, pedicels mostly bracteate, calyx-lobes ½ as long as the tube short obtuse or subacute suberect in fruit. *Benth. in DC. Prodr.* x. 375; *Wall. Cat.* 3912; ? *Wight Ic.* t. 1467.

TEMPERATE HIMALAYA; from Kunawar to Bhotan, alt. 3–7000 ft. KHASIA MTS., alt. 4–5000 ft. ? NILGHIRI MTS., *Schmidt*, *Hohenacker*, *G. Thomson*.

In its ordinary state very different from *M. rugosus* in the shorter racemes, the often pinnatifid leaf-bases, bracts and calyx; but small specimens of either are difficult to distinguish. The Nilghiri specimens are very small and dense, without runners or bracts, but they have the short-lobed calyx of *M. surculosus*; they may prove specifically different. The figure in Wight's Icones represents the calyx very incorrectly.

3. **M. dentatus,** *Wall. Cat.* 3914; runners 0, radical leaves long-petioled elliptic-oblong or ovate sinuate, pedicels bracteate, calyx-lobes ⅓ the length of the tube rounded ovate or triangular obtuse or acute suberect in fruit. *Benth. Scroph. Ind.* 27, and in *DC. Prodr.* x. 375.

TEMPERATE HIMALAYA; Kumaon, alt. 8000 ft., *Strach. & Winterb.*; Nepal, *Wallich*; Sikkim, alt. 6–8000 ft., *J. D. H.*, *Treutler*. KHASIA MTS.; Nunklow, alt. 5000 ft., *Simons*.

Glabrous or sparsely hairy. *Rootstock* perennial. *Leaves* 1–4 in., base acute rounded or subcordate; petiole ½–3 in. *Flowering branches* or scapes 3–6 in., erect or decumbent, slender, few-fld., leafless. *Flowers* distant, ½–1 in. long; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in.; bracts setaceous. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in. long, lobes sometimes longer and acute as in *M. rugosus*. *Seeds* twice as large as in *M. rugosus*, black.

13. LANCEA, *Hook. f. & Thoms.*

A small glabrous herb. *Leaves* radical and opposite, obovate-oblong or spathulate, quite entire. *Flowers* in a very short terminal few-fld. raceme, pedicels bracteate. *Calyx* campanulate, 5-fid. *Corolla-tube* dilated above; upper lip suberect, concave, 2-lobed; lower large, spreading, 3-lobed, palate 2-convex. *Stamens* 4, didynamous, subexserted; anther-cells diverging. *Style* filiform, stigma 2-lamellate. *Fruit* globose, indehiscent, exserted. *Seeds* numerous, small, subglobose, testa thin.

L. tibetica, *Hook. f. & Thoms. in Hook. Kew Journ.* ix. 244, t. 7.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11–16,000 ft., *Thomson*, &c.

Rootstock slender, horizontal, creeping. *Leaves* rosulate, or opposite on a very short stem 1–4 in. high, 1–3½ in. long, obtuse or subacute, narrowed into a ½-amplexicaul petiole ¼–1 in. long, rather coriaceous, sometimes very obscurely toothed. *Flowers*

sunk amongst the leaves, pedicels very short, bracts lanceolate. *Calyx-lobes* acute. *Corolla* ¾–1 in. long, blue, lower lip hairy within. *Fruit* the size of a pea, hardly fleshy. *Seeds* brown.

14. LINDENBERGIA, *Lehm.*

Annual or perennial herbs, woody below; branches erect, straggling or ascending. *Leaves* opposite or the upper alternate, toothed. *Flowers* axillary or spicate or racemed, bracteate, ebracteolate, yellow. *Calyx* campanulate, 5-fid. *Corolla-tube* cylindric; upper lip the outer, short, broad, notched or 2-fid; lower larger, 3-lobed, spreading, base with two plaits. *Stamens* 4, didynamous, included; anther-cells separate, stipitate, all with pollen. *Capsule* 2-grooved, loculicidal; valves entire, separating from the placentiferous axis. *Seeds* numerous, minute.—Species 8, African, Indian and Malayan.

1. **L. grandiflora,** *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 376; softly hairy, subscandent, leaves petioled ovate acuminate coarsely serrate, flowers secund in terminal lax-fld. spikes, calyx-lobes obtuse, ovary villous. Stemodia grandiflora, *Ham. in Don Prodr.* 89; *Wall. Cat.* 3924.

SUBTROPICAL HIMALAYA, alt. 2–6000 ft.; from Sirmore to Bhotan, abundant. PEGU, *Kurz.*

A rambling perennial, with flexuous stem and branches. *Leaves* 2–8 in., pubescent on both surfaces; nerves 6–8 pair; petiole ¼–1½ in. *Spikes* 6–10 in., sometimes panicled; bracts ¼–½ in., ovate, sessile or shortly petioled; flowers 1 in. long, sessile or very shortly pedicelled. *Corolla* pubescent, tube 3 times as long as the calyx. *Capsule* ovoid, tip exserted.

2. **L. Hookeri,** *Clarke mss.*; glabrous except the inflorescence, subscandent, leaves petioled elliptic-lanceolate acuminate coarsely serrate, flowers secund in terminal lax-fld. spikes, calyx-lobes acute, ovary glabrous. Lindenbergia n. 3, *Herb. Ind. Or. H.f. & T.*

TROPICAL SIKKIM HIMALAYA; foot of the outer hills, alt. 3–4000 ft.; *J. D. H.*, *Clarke.*

Habit of *L. grandiflora,* but more slender and nearly glabrous. *Leaves* 2–3 in., base cuneate; petiole ¼–⅓ in. *Spikes* 1–2 in., shortly peduncled, glandular, puberulous; bracts sessile, ovate, acute, about equalling the calyx; lower flowers sometimes shortly pedicelled. *Calyx* cleft to the middle, teeth triangular. *Corolla* 1 in. long, glabrous without, tube nearly straight, two to three times as long as the calyx; upper lip short, 2-fid; lobes of lower rounded, crenate, densely pubescent within. *Anther-cells* sausage-shaped, quite separate, pendulous from the top of the filament.

3. **L. philippensis,** *Benth. in DC. Prodr.* x. 377; softly pubescent or villous above, stout, strict, erect, leaves ovate or ovate-lanceolate, toothed, flowers unilateral in rigid erect dense-fld. spikes or racemes, calyx longer than the bracts, lobes ovate-lanceolate acuminate, ovary villous. Stemodia philippensis, *Cham. in Linnæa,* iii. 5. Stemodia sp., *Griff. Notul.* iv. 99, and *Ic. Pl. Asiat.* t. 421.

CHITTAGONG, *Clarke.* PEGU, *Kurz.* BURMA; common about pagodas, *Griffith.* TENASSERIM, *Helfer, Lobb.*—DISTRIB. Siam, China, Philippine Islands.

Stem 2–3 ft. *Leaves* 2–4 in., much produced below into a slender petiole about half the length of the blade. *Racemes* or *spikes* 1 ft. and upwards; rachis very stout; flowers shortly pedicelled or not; bracts lanceolate. *Calyx* ¼ in. long. *Corolla* ¼–½ in., pubescent. *Capsule* lanceolate, tip exserted.

4. **L. macrostachya,** *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 376; glabrate or pubescent, stem strict erect stout or slender, leaves elliptic-ovate serrate glabrous, flowers unilateral in rigid erect dense or lax-fld. spikes, calyx longer than the bracts, lobes short acute, ovary pubescent. Stemodia macrostachya, *Benth. in Wall. Cat.* 3925; and 3852 Adenosma cuspidatum. L. siamensis, *Miquel in Herb.*

WESTERN HIMALAYA; on the foot-hills and plains below them, from the Punjab to Oudh, ascending to 4000 ft. MARTABAN, *Wallich.*—DISTRIB. Siam, China.

Perhaps only a variety of *L. philippensis,* but more glabrous, with shorter petioles.

5. **L. abyssinica,** *Hochst. in Herb.*; *Benth. in DC. Prodr.* x. 377; glandular-pubescent or villous, leaves broadly ovate coarsely crenate-toothed, flowers unilateral in lax terminal spikes, calyx shorter than the lower bracts, lobes ovate acute, ovary glabrous.

SCINDE, amongst rocks, *Dalzell.*—DISTRIB. Arabia, Somali country, Abyssinia.

Stem rather slender, 11–18 in., branched. *Leaves* 1–1½ in., and nearly as broad, hairy on both surfaces; petiole ¼–½ in. *Spikes* 3–4 in.; lower bracts leafy, coarsely toothed. *Calyx* ¼ in. *Corolla* ⅓ in. *Capsule* hardly exserted.

6. **L. Griffithii,** *Hook. f.;* silkily villous, subscandent, leaves short-petioled ovate-lanceolate acuminate, flowers unilateral in axillary and terminal recurved simple or panicled racemes, calyx much longer than the small bracts, lobes short triangular acute, ovary glabrous.

BHOTAN, *Griffith* (Kew Distrib. 3882).

Stem apparently tall, slender, flexuous, clothed, as are the leaves beneath, petioles and rachis of the racemes, with soft silky appressed hairs. *Leaves* 4–6 by 1½–2 in., pubescent above; petiole ¼–½ in. *Racemes* numerous, 2–4 in.; rachis slender; pedicels very short. *Calyx* ⅙ in. long. *Corolla* twice as long, hairy. *Capsule* turgidly ovoid, tip exserted.—A very distinct species.

7. **L. polyantha,** *Royle in Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 377; villously pubescent, erect, leaves small ovate obtuse crenately serrate, flowers unilateral in axillary and terminal leafy spikes, calyx shorter than the ovate bracts, lobes obtuse, ovary pubescent. Dodartea indica, *Linn. Sp. Pl.* 883.

NORTHERN INDIA; from the Punjab and N. Scinde to the Concan, Behar and Dacca, common on walls and banks, &c., ascending the Himalaya to 6000 feet.

Stem 12–18 in., often branched from the base; branches erect or ascending, stout or slender. *Leaves* very numerous and uniform up the stem and branches, ½ rarely ¾ in. long; petiole usually very short. *Spikes* 2–6 in.; flowers and bracts crowded. *Calyx* ⅙ in. long. *Corolla* twice as long. *Capsule* glabrous below, hairy above.—The ovary is certainly hairy.

8. **L. urticæfolia,** *Lehm. in Link et Otto Abbild.* 95, t. 48; slender, glandularly villous or glabrate, leaves ovate obtuse crenate-serrate, flowers unilateral all axillary and solitary or 2-nate or in lax leafy slender spikes or racemes, calyx shorter than the ovate leafy bracts, lobes obtuse, ovary pubescent. *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 377; *Hook. Ic. Pl.* t. 875; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 425. Stemodia ruderalis, *Vahl Symb.* ii. 69; *Roxb. Fl. Ind.* iii. 94; *Wall. Cat.* 3923. S. muralis, *Roxb. in Don Prodr.* 89. Brachycoris parviflora, *Schrad. Ind. Sem. Gott.* 1830.

Throughout INDIA, on walls and banks, ascending to 6000 ft. in the Himalaya;

from Jamu to the Nilgherries and Tenasserim; not seen from Ceylon or Malacca.—DISTRIB. Affghanistan, Burma.

Annual, 4–10 in. high, brittle. *Stem* sometimes simple with all the flowers solitary in the axils of large leaves, at others branched, the branches running out into leafy racemes. *Leaves* 1–1½ (rarely 2½) in. long, membranous; petiole ¼–⅜ in. *Flowers* shortly pedicelled. *Calyx* ⅛ in., lobes recurved. *Corolla* twice as long, sparsely hairy, yellow. *Capsule* hairy above the middle.

15. ADENOSMA, *Br.*

Annual, villous or glandular, aromatic herbs. *Leaves* opposite, rugose, crenulate. *Flowers* axillary or in leafy spikes racemes or heads, bracteolate or not. *Sepals* 5, sometimes very large in fruit. *Corolla-tube* cylindric; upper lip erect, entire or notched; lower spreading, 3-lobed, base not plaited. *Stamens* 4, didynamous, included; anther-cells separate, stipitate, one cell of all the anthers, or of the two anterior anthers only empty. *Style* dilated at the tip, winged below the entire or 2-lamellate stigma. *Capsule* ovoid ellipsoid or lanceolate, 2-grooved, loculicidal and septicidal, 4-valved. *Seeds* many, minute, reticulate.—Species 8 or 9, Asiatic, Malayan and Australian.

* *Flowers axillary; outer fruiting sepals very large, cordate or ovate.*

1. **A. ovatum,** *Benth. in Gen. Pl.* ii. 949; puberulous or glabrate, leaves ovate obtuse crenate-serrate, flowers axillary sessile, 3 outer sepals in fruit very large cordate, 2 inner very small lanceolate. Herpestis ovata, *Benth. Scroph. Ind.* 30, and in *Wall. Cat.* 3896. H. javanica, *Blume Bijd.* 748. Pterostigma ovatum, *Benth. in DC. Prodr.* x. 380; *Miquel Fl. Ind. Bat.* ii. 678.

MALAY PENINSULA; from Tenasserim, *Griffith*, to Malacca, *Wallich*.—DISTRIB. Sumatra, Java, Borneo.

Branched from the base, black when dry; branches 6–18 in., often rooting below, ascending. *Leaves* 1–1½ in., base cuneate or subcordate; petiole ¼ in. *Fruiting sepals* ¼–½ in., membranous, reticulate, pubescent; small equalling the lanceolate capsule.

2. **A. subrepens,** *Benth. in Gen. Pl.* ii. 949; sparingly hirsute, leaves ovate crenate, 3 outer sepals in fruit large ovate-lanceolate, 2 inner subulate. Pterostigma subrepens, *Thwaites Enum.* 426.

CEYLON; Pasdoon Corle and Nana Welle-Galle, *Champion, Thwaites.*

Very near to *A. ovatum,* but a coarser, larger, more hirsute plant, with narrower fruiting sepals.

** *Flowers racemose, spicate or capitate; upper fruiting sepal lanceolate, not very large.*

3. **A. cœruleum,** *Br. Prodr.* 443; erect, viscidly hirsute, leaves ovate-subulate simply or doubly crenate, spikes long, flowers blue, upper fruiting sepal lanceolate, the others linear. *Benth. Fl. Austral.* iv. 484. A. villosum, *Benth. in Wall. Cat.* 3851. Pterostigma villosum, *Benth. Scroph. Ind.* 21, and in *DC. Prodr.* x. 380 (*in part*); *Miquel Fl. Ind. Bat.* ii. 678. P. strictum, *Griff. Notul.* iv. 96, and *Ic. Pl. Asiat.* t. 417, f. 3. Stemodia cœrulea, *Benth. in DC. l. c.* 381. Herpestis lanuginosa, *Blume Bijd.* 747.

KHASIA MTS., alt. 0–4500 ft., *Wallich, Clarke.* CACHAR, *Keenan.* TENASSERIM, SINGAPORE, and MALACCA, *Wallich,* &c.—DISTRIB. Java, Borneo, Australia.

Stem 1–2 ft., strict. *Leaves* 1½–2½ in., base rounded or cordate; petiole ½–1 in. *Corolla* blue. *Fruiting calyx* ½ in. long; sepals variable in width.

4. **A. camphoratum,** *Hook. f.*; stem and leaves glabrous or sparingly pubescent, leaves ovate-lanceolate acute obtusely serrate narrowed into the petiole, racemes glandular-pubescent lax-fld., flowers yellow, upper fruiting sepal lanceolate, the others linear. Stemodia camphorata, *Vahl Symb.* ii. 69. S. lutea, *Moon Cat. Pl. Ceyl.* 45. Pterostigma villosum, *Thwaites Enum.* 218.

CEYLON; south parts of the island, common.

Stem 2–3 ft., rather slender. *Leaves* 2½–4 in., the petiole quite continuous from the blade and stem. *Racemes* numerous, lateral, ascending; pedicels ¼–½ in. *Flowers* yellow. *Fruiting calyx* ½–⅔ in.—Miquel refers Vahl's *S. camphorata* to *A. cœruleum;* but its yellow flowers and country both indicate its being *A. camphoratum.*

5. **A. malabaricum,** *Hook. f.*; densely glandular-tomentose, leaves subsessile oblong-ovate subacute serrate, flowers sessile in foliaceous elliptic entire bracts, upper fruiting sepal lanceolate, the others subulate-lanceolate.

MALABAR, *Wight.*

Stem 8–12 in., stout, sparingly branched, leafy throughout its length, the leaves gradually passing into bracts. *Leaves* 1 in., narrowed into a very short petiole, margin entire below the middle. *Bracts,* lower ¾, upper ¼ in. *Calyx* ¼ in., a little longer than the capsule.

6. **A. capitatum,** *Benth. in Gen. Pl.* ii. 949; stout, erect, glandular-villous, leaves shortly petioled ovate or oblong subacute serrate, flowers in axillary whorls and dense cylindric villous spikes or globose heads, sepals lanceolate, upper largest. Stemodia capitata, *Benth. in Bot. Reg. under* t. 1470; *Wall. Cat.* 3926. Pterostigma spicatum, *Benth. Scroph. Ind.* 21. P. capitatum, *Benth. Scroph. Ind.* 21, and in *DC. Prodr.* x. 380. Erinus bilabiatus, *Roxb. Fl. Ind.* iii. 92.

OUTER LOWER HIMALAYA, from KUMAON to SIKKIM; BENGAL and ASSAM to MALACCA, TRAVANCORE and CEYLON; usually in rice-fields, absent in the plains of Western India.—DISTRIB. Malaya, Burma, China.

Stem 1–2 ft. *Leaves* often reflexed, 1–2 in., base cuneate; petiole hardly any. *Heads* or spikes ½–4 in. long, involucrate by floral leaves. *Flowers* blue, densely packed; bracts linear, hardly exceeding the flowers. *Calyx* ¼ in. long, villous with long hairs, ⅓ longer than the ovoid capsule.—The specific names of (*Erinus*) *bilabiatus,* Roxb., and (*Stemodia*) *capitata,* were published in the same year. I give the preference to Bentham, who placed the plant approximately in the right genus.

7. **A. microcephalum,** *Hook. f.*; slender, glandular-hairy, leaves small shortly petioled ovate or elliptic subacute serrulate, flowers usually capitate, heads small axillary and peduncled or interruptedly spicate, sepals lanceolate subequal.

TENASSERIM, *Helfer;* Moulmein, *Lobb.*—DISTRIB. Cambodia.

Stem 6–10 in., erect, simple below, branched paniculately above. *Leaves* ½–¾ in., base cuneate; petiole $\frac{1}{10}$ in. *Heads* ⅓–½ in. long, sometimes running out into spikes, and lower flowers sometimes solitary and axillary. *Flowers* blue; bracts small, slender. *Calyx* ⅛ in. long, ⅓ longer than the ellipsoid acute capsule.—Very near *A. capitatum,* but much smaller, more slender.

8. **A. macrophyllum,** *Benth. in Wall. Cat.* 3853; leaves ovate acuminate crenate-serrate narrowed at the base flaccid glabrescent, corolla twice as long as the calyx. Pterostigma macrophyllum, *Benth. Scroph. Ind.* 21, and in *DC. Prodr.* ix. 380.

BURMA; banks of the Irawaddi, *Wallich.*

This plant has not been found in the Wallichian Herbarium.

16. **STEMODIA,** *Linn.*

Character of *Adenosma*, but anther-cells all polleniferous. *Leaves* sometimes whorled. *Seeds* ellipsoid, terete, black or brown, most minute.—Species about 26, American, African, Asiatic and Australian.

1. **S. viscosa,** *Roxb. Cor. Pl.* ii. 33, t. 163, and *Fl. Ind.* iii. 94; erect, viscidly pubescent, leaves sessile oblong base cordate serrulate, flowers pedicelled axillary and in terminal racemes, corolla twice as long as the calyx. *Wall. Cat.* 3929; *Benth. Scroph. Ind.* 24, and in *DC. Prodr.* x. 381; *Wight Ic.* t. 1408; *Dalz. & Gibs. Bomb. Fl.* 176. S. maritima, *Heyne in Wall. Cat.* 3931. S. arvensis, *Steud. Nomencl.*

From CENTRAL INDIA and the Soane river throughout the DECCAN.—DISTRIB. Affghanistan.

Erect, branched from the base, 6–18 in. high, aromatic; stem angular. *Leaves* ¼–2 in., rarely ovate or obovate, sometimes very small throughout the plant; floral bracts shorter than the pedicels. *Flowers* very numerous, nearly ½ in. long, 2-bracteolate; pedicels equalling or exceeding the calyx. *Sepals* lanceolate, acute, half as long as the violet corolla. *Capsule* ¼–⅓ in. long, equalling the calyx, acuminate.

2. **S. serrata,** *Benth. in DC. Prodr.* x. 381; erect, viscidly pubescent, leaves sessile obovate-oblong acute serrulate, flowers subsessile axillary, corolla one-half longer than the calyx. Sutera serrata, *Herb. Hochstett.*

The CONCAN, *Stocks, Law.*—DISTRIB. Nubia, Upper Nile and Senegambia.

A robust leafy annual a foot high and under, usually densely branched from the base; stem obtusely 4-angled. *Leaves* ¼–2 in., narrowed to the sessile base, entire below the middle. *Flowers* often in all the axils, smaller than in *S. viscosa*. *Capsule* linear-oblong.

17. **LIMNOPHILA,** *Br.*

Glabrous or pubescent often marsh or water plants, aromatic and with transparent dots. *Leaves* opposite or whorled, toothed, cut, or the submersed multifid. *Flowers* pedicelled or sessile, axillary, solitary or racemose or spicate, bracteolate or not. *Sepals* narrow, subequal or the posterior larger. *Corolla-tube* cylindric, upper lip the outer in bud, suberect, entire or 2-fid; lower spreading, 3-fid, base not plaited. *Stamens* 4, didynamous, included; anther-cells usually separate and stipitate. *Style* deflexed at the tip, stigma shortly 2-lamellate. *Capsule* ovoid or oblong, septi- and loculi-cidal, valves bearing placentiferous septa. *Seeds* numerous, small, angular, truncate, reticulate.—Species about 25, African, Asiatic and Australian.

A very variable genus, the foliage and habit of the species depending upon the depth, &c., of the water in which they grow.

* Nerves of leaf pinnate, arching from the midrib. No whorled and pinnatifid or multifid leaves.

† *Flowers sessile or subsessile (sometimes racemose in* L. diffusa). *Leaves opposite very rarely 3-nately whorled.*

1. **L. Roxburghii,** *G. Don Gen. Syst.* iv. 543, *not of Benth.*; pubescent or glabrous, leaves all opposite petioled elliptic or ovate obtuse or subacute crenulate coriaceous punctate beneath, nerves strong, flowers axillary sessile in peduncled heads rarely solitary, calyx pubescent, lobes lanceolate finely acuminate not striate in fruit. L. menthastrum, *Benth. in DC. Prodr.* x.

386; *Dalz. & Gibs. Bomb. Fl.* 175. Herpestis rugosa, *Roth Nov. Sp.* 290. Capraria gratissima, *Roxb. Fl. Ind.* iii. 92, (*excl. citat. of Rheede*). Antirrhinum gratissimum, *Roxb. Ic. ined.* Stemodia menthastrum, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3927. Adenosma triflora, *Seem. Fl. Viti* 284, *not of Nees.*

Watery places in the plains of N. INDIA, and outer HIMALAYA, ascending to 6000 ft., from Chamba to Mishmi; ASSAM, BENGAL, SILHET, CENTRAL INDIA, and the CONCAN and CIRCARS.—DISTRIB. Java, China, the Philippines, Pacific Islands.

Annual, aromatic; root creeping; stems many, 1–2 ft., stout; "nodes under water emitting many fibrous roots or multifid filiform leaves," *Roxburgh. Leaves* 2–3 in., often rugose, narrowed into a petiole of ¼–1 in.; nerves many, stout. *Flowers* usually in axillary sessile or shortly peduncled heads. *Corolla* ⅓ in. long, pubescent, blue-purple, mouth yellow. *Capsule* ellipsoid.—Roxburgh's drawing identifies this plant with his *Capraria gratissima.* He quotes Rheede's Pola-tsjira (ix. t. 78) for the same, but I have seen no specimens from Malabar, and Rheede makes no mention of the aromatic smell and taste, which he could not fail to have noticed if this plant had been under his observation.

2. **L. balsamea,** *Benth. in DC. Prodr.* x. 386; softly pubescent, leaves all opposite sessile elliptic subacute narrowed at the base obscurely crenulate punctate beneath, nerves slender, flowers axillary in shortly peduncled heads or spikes, calyx hirsute, lobes lanceolate finely acuminate striate in fruit. Stemodia balsamea, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3928.

PEGU, *M'Lelland.* TENASSERIM, *Wallich*; Mergui, *Griffith.*

Stem 1–2 ft., stout. *Leaves* 1–2 in., entire below the middle, nerves 3–5-pair. *Corolla* ½ in., twice as long as the calyx. *Capsule* broadly elliptic, obtuse.—*L. villifera,* Miquel, of Sumatra, is probably this.

3. **L. conferta,** *Benth. in DC. Prodr.* x. 387; erect or procumbent, glabrous except the inflorescence, leaves all opposite sessile or subpetioled oblong or elliptic-oblong obtuse crenate-serrate punctate beneath, base narrowed or subamplexicaul, nerves slender, flowers axillary solitary or in short axillary heads spikes or cymes, calyx glabrate, segments lanceolate finely acuminate striate in fruit. *Dalz. & Gibs. Bomb. Fl.* 177. L. repens, *Benth. l. c.* 387. L. serrata, *Benth. l. c.* (*the Burma plant only*); *Thwaites Enum.* 218. ? L. punctata, *Vahl Enum.* i. 90, and Bonnaya punctata, *G. Don Gen. Syst.* iv. 538. Stemodia sessilis, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3939. S. tenuiflora, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3940. S. repens, *Benth. in Wall. Cat.* 3935. Gratiola lucida, *Heyne.*—? *Rheede Hort. Mal.* ix. t. 78.

Marshes, from ASSAM, BENGAL and CHITTAGONG to TENASSERIM and BURMA; throughout the DECCAN and CEYLON.

A very variable plant; in its larger state diffuse, 12–18 in. long, with subpetioled leaves 1–1½ in. long, and often spicate flowers; in its smaller (*St. sessilis,* Wall.) short, stout, with quite sessile oblong leaves ½ in. long, and crowded axillary flowers; in its smallest state (*St. tenuiflora,* Wall., and *serrata,* Bth.) erect or procumbent, with oblong sessile leaves ¼–½ in. long and solitary axillary flowers. Between these there are all intermediates. Thwaites has reduced all to Gaudichaud's *L. serrata,* a Polynesian plant with solitary flower and sepals not striated.—*Leaves* very minutely punctate, entire below the middle, nerves few, faint. *Corolla* about ½ in. long. *Capsule* as in *L. balsamea,* but much smaller.—Heyne's *Gratiola lucida,* referred here by Bentham, is a small creeping form approaching *L. micrantha.*

4. **L. diffusa,** *Benth. in DC. Prodr.* x. 387, *not of G. Don*; erect or decumbent, pubescent, leaves all opposite petioled elliptic-ovate or oblong-lanceolate subacute crenate-serrate punctate beneath, nerves slender, flowers

in short axillary cymes or long spikes or racemes, calyx hirsute, lobes lanceolate finely acuminate striate in fruit. L. camphorata, *Benth. in Wall. Cat.* 3932, and *Scroph. Ind.* 24, *not of Vahl.* Stemodia cimicina, *Benth. in Wall. Cat.* 3933.

EASTERN BENGAL to CHITTAGONG, BURMA and TENASSERIM. TRAVANCORE, *Wight.* CANARA, *Hohenacker.*—DISTRIB. Sumatra.

Closely allied to *S. conferta*, but with pubescent more strongly nerved crenate-serrate leaves, and often racemose flowers.—Roxburgh's *Capraria diffusa* (*Limnophila diffusa*, G. Don) is *Ebermeyera thyrsoidea*, Kurz in Journ. As. Soc. 1870.

5. **L. micrantha,** *Benth. in DC. Prodr.* x. 387; small, creeping below, glabrous, leaves opposite small sessile entire or subserrate, nerves very obscure, flowers axillary subsessile, calyx ^{1} in. long glabrous, lobes subulate fruiting striate. Stemodia micrantha, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3936. Herpestis pygmæa, *Griff. Notul.* iv. 104.

Marshy places in BENGAL, ASSAM, SILHET, CHITTAGONG and TENASSERIM.—DISTRIB. Cochin-China.

Stem 3–6 in., stout, branching from the root. *Leaves* crowded, $\frac{1}{4}$–$\frac{1}{2}$ in., punctate, thick, teeth few. *Flowers* $\frac{1}{5}$–$\frac{1}{6}$ in. long, red-purple.—A very distinct little species.

†† *Flowers pedicelled. Leaves all opposite.—See also* 10, L. gratissima; *and* 11, L. hirsuta.

6. **L. laxa,** *Benth. in DC. Prodr.* x. 388; stem 8–12 in. slender flaccid sparsely hairy, leaves all opposite subsessile or petioled oblong-lanceolate obtuse subcrenate, nerves very slender, flowers solitary axillary, pedicels longer than the calyx, calyx hirsute, lobes subulate fruiting striate. Herpestis sp. 2, *Griff. Notul.* iv. 103.

TENASSERIM; at Mergui, *Griffith*; Tavoy, *Parish.* CEYLON, *Walker.*

Stem ascending, rooting at the lower nodes. *Leaves* $\frac{3}{4}$–$1\frac{1}{2}$ in., flaccid, narrowed into a short petiole.—Resembles a reduced form of *L. hirsuta.*

7. **L. erecta,** *Benth. in DC. Prodr.* x. 388; glabrous, stem 4–6 in. subsimple stout erect, leaves all opposite subsessile linear-oblong subserrate, nerves obscure, flowers solitary axillary, pedicels shorter than the calyx, fruiting recurved, calyx $\frac{1}{6}$ in. glabrous, lobes lanceolate acuminate fruiting striate. *Maxim. Diagn. Pl. Nov. Dec.* xix. 406. Stemodia gratioloides, *Benth. Scroph. Ind.* 25; *Wall. Cat.* 3938.

BENGAL; Serampore, *Griffith.* TENASSERIM; at Tavoy, *Wallich.*—DISTRIB. China.

A small stout species, with leaves rarely 1 in. long.

8. **L. pulcherrima,** *Hook. f.*; stem 4–6 in. pubescent, stout, erect or ascending, leaves all opposite sessile elliptic-oblong subcrenate, nerves obscure, flowers axillary solitary, pedicels shorter than the calyx fruiting erect, calyx $\frac{1}{6}$ in. hirsute, lobes subulate acuminate fruiting striate. L. laxa, *Benth. in DC. Prodr.* x. 388, *in part.* L. villosa *var.* sumatrana, *Miquel Fl. Ind. Bat.* ii. 68. Herpestis pulcherrima, *Griff. Notul.* iv. 104.

BENGAL; at Comilla, *Clarke.* MALACCA, *Griffith, Cuming.* SINGAPORE, *G. Thomson.*—DISTRIB. Sumatra.

Very closely allied to *L. laxa* and *L. erecta*, differing from the former in the stout erect habit, and more sessile shorter leaves; and from the latter in the pubescence and the erect fruiting pedicels.

9. **L. pygmæa,** *Hook. f.*; glabrous, much branched, creeping, branches 4–6 in. divaricate, leaves all opposite sessile oblong-lanceolate acute subserrate, nerves very obscure, flowers axillary solitary, pedicels equalling or exceeding the calyx erect in fruit, calyx $\frac{1}{6}$ in. hirsute, lobes subulate-lanceolate fruiting striate. Herpestis pygmæa, *Griff. Notul.* iv. 104. Stemodia diffusa, *Benth. in Wall. Cat.* 3937.

TENASSERIM; at Tavoy, *Gomez, Helfer;* Mergui, *Griffith.* MALACCA, *Griffith, Cuming.*

Very near to *L. laxa*, but much smaller, more glabrous, with leaves less than $\frac{1}{2}$ in. long.

††† *Leaves some or most 3–4-nately whorled, sometimes all opposite in* L. gratissima *and* hirsuta.

10. **L. gratissima,** *Blume Bijd.* 749; erect, 1–2 ft., glabrous, leaves opposite and 3-nately whorled $\frac{1}{2}$-amplexicaul linear-oblong subacute serrulate, flowers in axillary and terminal many-fld. racemes rarely solitary, calyx usually shorter than the pedicels glabrate, lobes lanceolate acuminate fruiting striate. *Benth. Scroph. Ind.* 26; *Wall. Cat.* 3906; *Dalz. & Gibs. Bomb. Fl.* 177. L. punctata, *Blume l. c.* 750; *Benth. in DC. Prodr.* x. 388; *Miquel Fl. Ind. Bat.* ii. 682; *Maxim. Diagn. Pl. Nov. Dec.* xix. 406. Gratiola aromatica, *Pers. Synops.* i. 14. Ambulia aromatica, *Lamk. Encycl.* i. 128.—*Rheede Hort. Mal.* x. 6.

Watery places. CACHAR, *Keenan.* PEGU, *Kurz.* MALACCA, *Maingay.* The DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Malay and Philippine Islands, China, Japan, N. Australia.

Stem stout, simple, rarely branched above. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., nerves few and faint. *Racemes* sometimes 1 foot long and paniculately branched, with the flowers whorled, at others few-fld., or flower solitary and axillary; pedicels $\frac{1}{2}$–1 in., glandular; bracteoles minute. *Calyx* $\frac{1}{4}$ in. long, glandular, fruiting hemispheric. *Corolla* $\frac{1}{2}$ in. long. *Capsule* oblong, acute.—Blume's *L. gratissima* is the typical form of this plant, *L. punctata* being a reduced state with solitary flowers in the axils.

11. **L. hirsuta,** *Benth. in DC. Prodr.* x. 388; erect, stem 6–18 in. hirsute rarely glabrate, leaves opposite or 3–4-nately whorled sessile or narrowed into a short petiole elliptic linear-oblong or subspathulate serrulate, nerves very obscure, flowers axillary solitary or cymose or panicled at the top of the stem, pedicels long or short, calyx hirsute, lobes lanceolate finely acuminate fruiting striate. Stemodia hirsuta, *Heyne; Benth. Scroph. Ind.* 24; *Wall. Cat.* 3930. Ambulia ebracteata, *Herb. Ham.*

Wet places, from ASSAM to CHITTAGONG and the NICOBAR ISLANDS. DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Borneo, China.

Best distinguished from *L. gratissima* by its pubescence, less racemose inflorescence, and more orbicular capsule. There are what appear to be glabrous states of it from Chota Nagpore (Ranchee, alt. 2000 ft., *Clarke*) and Balaghat (*Wight*) with always opposite leaves.

12. **L. polyantha,** *Kurz mss.*; glandular-pubescent, stem slender 6–18 in., leaves 4-nately whorled $\frac{1}{2}$-amplexicaul linear serrulate, nerves obscure, cymes terminal panicled, flowers very numerous small shortly pedicelled, calyx $\frac{1}{8}$ in., lobes subulate fruiting not striate.

Marshes. SIKKIM TERAI, *Herb. Griffith*; Siligoree, *Clarke.* PEGU, *Kurz.*

A graceful species, conspicuous for the copious minute flowers in a subpyramidal inflorescence. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., all whorled except in starved forms. *Peduncles* and

pedicels very slender; bracteoles nearly as long as the calyx. *Corolla* about $\frac{1}{4}$ in. long. *Capsule* obovoid-oblong.

** Leaves with 3–5 parallel nerves running from the base to the tip, or pinnatifid or multifid.

† *Flowers sessile or very shortly pedicelled.*

13. **L. Helferi,** *Hook. f.*; glabrous, 4–6 in., stem or branches very slender ascending, leaves opposite and 3–4-nately whorled sessile linear obscurely serrulate, flowers minute very numerous in peduncled axillary cymes, pedicels shorter than the calyx and peduncles capillary, calyx $\frac{1}{10}$ in. long, lobes subulate erect, fruiting very narrow striate.

TENASSERIM, *Helfer.*

A very elegant little plant, the smallest flowered of any allied to *L. polyantha,* of which it is a glabrous miniature. *Leaves* $\frac{1}{6}$–$\frac{1}{2}$ in. long. *Pedicels* rarely as long as the narrow calyx. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. long. *Capsule* obovoid-oblong.

14. **L. hypericifolia,** *Benth. in DC. Prodr.* x. 386; glabrous, stem 1–2 ft. stout erect simple, leaves all opposite and entire $\frac{1}{2}$-amplexicaul elliptic or ovate-oblong obtuse crenulate, flowers large sessile in the axils of opposite or alternate leafy bracts forming terminal and axillary sessile or peduncled spikes, calyx-lobes ovate acuminate, fruiting membranous not striate. Cybbanthera connata, *Ham. in Don Prodr.* 87. Herpestis connata, *Spreng. Syst. cur. post.* 234. Stemodia hypericifolia, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3934.

Marshy places in the WESTERN and CENTRAL HIMALAYA, from Kangra, *Edgeworth*, to Nepal, *Wallich.* KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.* NILGHIRI MTS., *Wight*, &c.

Stem rarely branched. *Leaves* all opposite in every specimen, $\frac{1}{2}$–2 by $\frac{1}{4}$– in., rather thick, minutely punctate beneath. *Flowers* $\frac{3}{4}$ in. long, rose-purple, pedicels very rarely $\frac{1}{6}$ in. *Corolla* twice as long as the calyx, purple, fruiting membranous. *Capsule* broadly elliptic.—I find no trace of pinnatifid or multifid leaves on any of the numerous specimens.

15. **L. cana,** *Griff. Notul.* iv. 98; stem 6–10 in. very stout hirsute, leaves 3–6-nately whorled sessile upper elliptic or linear-oblong obtuse serrulate 3–5-nerved, lower pinnatifid, flowers sessile crowded in terminal rarely axillary erect leafy spikes with opposite or whorled bracts, calyx-tubes subulate.

EAST BENGAL, in the Jheels, *Griffith, J. D. H. & T. T.*; Dacca and Pubna, *Clarke.*

Stem extensively creeping, sending up erect simple branches. *Leaves* $\frac{3}{4}$–1 by $\frac{1}{4}$–$\frac{1}{2}$ in., thick, gradually passing upwards into the bracts which are almost imbricate. *Flowers* quite sessile, violet. *Calyx* $\frac{1}{6}$ in. long, fruiting not seen.—I have referred this very distinct species to Griffith's *L. cana* at Mr. Clarke's suggestion; from the habitat and other characters it may be the true plant, but I have seen no specimens from Griffith, who describes the leaves as 3-nately whorled and the flowers as furnished with 2 most minute tooth-like bracteoles, which latter I do not find. It should be sought for at Jumalpore, Griffith's locality.

16. **L. polystachya,** *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 790; glabrous, floating, upper leaves opposite or 3–4-nately whorled sessile linear or oblong crenulate, lower capillaceo-multifid, flowers sessile in terminal and axillary long-peduncled slender spikes with short bracts. *Wall. Cat.* 3909; *Wight Ic.* t. 860. Stemodia aquatica, *Willd. Sp. Pl.* iii. 346. Conobea indica, *Spreng. Syst.* ii. 771.

Flooded grounds in the S. DECCAN, *Rottler*, &c.

Stem 1–2 ft. long, slender, erect or ascending from the long floating portion which is densely clothed with the dissected leaves. *Leaves*, upper ½–1½ in., from narrow linear to oblong, 3–5-nerved; in small specimens 4–8 in. high all the leaves are pinnatisect. *Spikes* sometimes divaricatingly branched, 2–6 in. long; bracts ovate, usually shorter than the flowers. *Calyx* ⅛ in., quite glabrous, fruiting hemispheric; lobes ovate, acuminate, not striate. *Corolla* much longer than the calyx, white. *Capsule* globose, as long as the calyx.

17. **L. sessiliflora,** *Blume Bijd.* 750; stem 4–8 in. slender hirsute above rarely glabrate, leaves 3–6 in a whorl all lobulate or pinnatisect or the uppermost very rarely opposite and entire, flowers axillary solitary sessile or very shortly pedicelled, fruiting calyx hemispheric membranous not striate, lobes ovate long-acuminate. *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 389; *Miquel Fl. Ind. Bat.* ii. 683; *Wall. Cat.* 3902. Hottonia sessiliflora, *Vahl Symb.* ii. 36.

Throughout INDIA, in rice-fields and swamps, from the Punjab to Bengal, Central India, Chittagong. CEYLON, common.—DISTRIB. Java, Japan.

Leaves rarely more than ½ in. long, irregularly pinnatifidly gashed or pinnatisect, but not capillaceo-multifid, or rarely so. *Sepals* with long points. *Corolla* ½ in. long. *Capsule* orbicular, turgid, ⅙ in. diam.—This strongly resembles a sessile-flowered form of *L. gratioloides*, or a short pubescent form of *L. heterophylla* wanting the multifid submerged leaves. Bentham's *L. gratioloides* var. *myriophylloides* seems more akin to this; it is a Ceylon plant with tufted creeping stems and roots, erect rigid branches 4–8 in. high, densely clothed with whorls of short capillaceo-multifid rigid leaves, giving a cylindric form to the branches, which are ½–1 in. diam. The flowers are sessile or pedicelled in the upper axils. The uppermost leaves are sometimes entire.

18. **L. heterophylla,** *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 390; glabrous, stem elongate slender, uppermost leaves usually opposite small sessile ½-amplexicaul oblong crenulate, those next below 4–6 in a whorl pinnatifid, the submerged long capillaceo-multifid, flowers axillary solitary sessile or subsessile, or the uppermost in a short leafy spike, fruiting calyx hemispheric membranous not striate, lobes ovate shortly acuminate. *Wall. Cat.* 3905; *Griff. Notul.* iv. 97, and *Ic. Pl. Asiat.* 416, f. 2. L. Roxburghii, *var.* tenuior, *Plant. Hohenack.* 679, *not of Don.* Columnea heterophylla, *Roxb. Fl. Ind.* iii. 97.

Throughout INDIA and CEYLON, in rice-fields and swamps.—DISTRIB. Borneo, Japan, China.

The much larger size, glabrous stem, abundant multifid leaves, frequent presence of upper opposite and alternate small entire floral leaves, and the shortly acuminate calyx-lobes distinguish this from *L. sessiliflora*, but there are a good many specimens which in a dried state may be referred to either.

VAR. *reflexa*; very slender, submerged leaves short ½ in. very finely divided, lower pedicels longer than the calyx recurved in fruit. L. reflexa, *Benth. Scroph. Ind.* 25, and in *DC. l. c.* 389; *Wall. Cat.* 3904.—Tavoy, *Wallich*; Malacca, *Cuming*.

19. **L. tillæoides,** *Hook. f.*; very small, 2–4 in. high, quite glabrous, leaves all whorled ⅛–¼ in. long upper pinnatifid lower multifid, flowers numerous axillary solitary, pedicels shorter than the calyx recurved in fruit, calyx not striate in fruit, lobes short triangular acute.

ASSAM; banks of the Kullung river, *Simons*.

A small loosely tufted species, stem and branches slender but rigid, with the whorls of leaves rather distant. Upper *flowers* sessile, lower pedicelled. *Corolla* ⅛–¼ in.

long. *Calyx* hemispheric in fruit, membranous. *Capsule* broadly oblong, nearly as long as the calyx.—A very singular little species.

†† *Flowers pedicelled, pedicels usually longer than the calyx.*

20. **L. racemosa,** *Benth. Scroph. Ind.* 26, and in *DC. Prodr.* x. 390; stem 1–2 ft. stout erect, leaves sessile upper opposite or 3-nately whorled $\frac{1}{2}$-amplexicaul ovate or linear-oblong serrulate, lower capillaceo-multifid, flowers large usually in erect terminal racemes, calyx-lobes ovate acuminate, fruiting not striate. *Wall. Cat.* 3907; *Wight Ic.* t. 861; *Dalz. & Gibs. Bomb. Fl.* 177. L. Benthamiana, *Miquel Plant. Hohenack.* n. 71 c. L. Roxburghii, *Benth. in DC. Prodr.* x. 388, *not of Don.* Cyrilla aquatica, *Roxb. Cor. Pl.* ii. 47, t. 189, and *Fl. Ind.* iii. 115.

Pools, &c., in BENGAL; at Dinagepore, *Clarke.* MARWAR; Mt. Aboo, *Kurz.* DECCAN PENINSULA and CEYLON, common.—DISTRIB. Java.

Stem hirsute or glabrous. *Leaves* $1\frac{1}{2}$–2 by $\frac{1}{4}$–$\frac{1}{2}$ in. most minutely punctate beneath, nerves strong. *Racemes* 2–6 in., strict; pedicels $\frac{1}{4}$–$\frac{2}{3}$ in., much longer than the bracts. *Calyx* $\frac{1}{4}$ in.; lobes with slender points, fruiting membranous. *Corolla* $\frac{3}{4}$ in. diam., $\frac{1}{2}$–$\frac{3}{4}$ in., bluish or purple, fragrant. *Capsule* almost globose.—The upper part of this resembles *L. hypericifolia* with pedicelled flowers; some states are with difficulty distinguished from *C. heterophylla*, and small ones from *L. gratioloides.*

21. **L. gratioloides,** *Br. Prodr.* 442; glabrous, stem short erect or diffusely branched or elongate and slender, leaves all whorled and pinnatifid or a few upper entire and opposite, or upper pinnatifid and lower multifid, flowers axillary solitary pedicelled rarely subracemose, calyx hemispheric in fruit, lobes ovate acuminate not striate. *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 389; *Gaud. in Freyc. Voy.* 447, t. 57, f. 1; *Wall. Cat.* 3901; *Dalz. & Gibs. Bomb. Fl.* 177; *Miquel Fl. Ind. Bat.* ii. 683. L. trifida, *Spreng. Syst.* ii. 802. L. myriophylloides, *Roth Nov. Sp.* 294. Gratiola virginiana, *Linn. Sp. Pl.* 25 (the *Malabar plant*). G. trifida, *Willd. Sp. Pl.* i. 104. Hottonia indica, *Linn. Sp. Pl.* 208; *Burm. Thes. Zeyl.* t. 55, f. 1. Hydropityon pedunculatum, *Seringe in DC. l. c.* i. 422. Columnea balsamea, *Roxb. Fl. Ind.* iii. 97.—*Rheede Hort. Mal.* ix. t. 85, and xii. t. 36. *Burm. Fl. Zeyl.* t. 55, f. 1.

Throughout INDIA, in swamps, rice-fields, &c.—DISTRIB. Beluchistan, Malayan Islands, China, Australia, Tropical Africa.

In its most common form a simple or branched plant 4–8 in. high, smelling of turpentine, with whorled pinnatifid leaves, $\frac{1}{4}$–$\frac{3}{4}$ in. long, which in wetter places appear to acquire a few emersed opposite entire leaves at the top of the stem, and numerous capillaceo-multifid ones at its base. The stems are stout or slender. Very small specimens from Rohilkund (Kuttra, *Edgeworth*) have very fine wiry simple stems 3 in. high, and capillary peduncles three times as long as the leaves; others have stout stems and peduncles, the latter shorter than the leaves. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. long, rarely larger. *Corolla* $\frac{1}{3}$ in.—Large specimens of var. *intermedia* approach *L. racemosa*; short-pedicelled ones are hardly distinguishable from *L. sessiliflora*; and the var. *elongata* is almost identical with *L. heterophylla.* Bentham's var. *myriophylloides* does not seem to me distinguishable from the common form of *gratioloides.*

VAR. *intermedia*; stem robust, leaves all close-set, flowers sometimes racemose with opposite entire bracteal leaves.—N.W. India; Moradabad, *Thomson*; Garwhal, *Strachey & Winterb.* (L. Roxburghii *in Herb.*); Subsiwaliks, *Edgeworth*; Kangra and Dharmsala, alt. 3–4000 ft., *Clarke.* (Beluchistan, *Stocks*).

VAR. *elongata,* Benth. in DC. l. c.; stem very long, upper leaves opposite entire, submerged capillaceo-multifid. L. elongata, *Benth. in Wall. Cat.* 3903.—Oude, *Wallich*; Moradabad, *Thomson*; Deccan, *Heyne, &c.*

22. **L. Griffithii,** *Hook.* f.; glabrous, stems densely tufted, branches

short 1–2 in. densely clothed with short whorled multifid leaves, flowers solitary long-pedicelled, fruiting pedicels deflexed. L. sessiliflora, *Griff. Notul.* iv. 99, t. 418, f. 5. L. gratioloides *var.* myriophylloides, *Benth. in DC. Prodr.* x. 389 (the Malacca plant). Quinquelobus glaber, *Benj. in Linnæa,* xx. 316. Benjaminea glabra, *Benj. l. c.* 761.

MALACCA, *Cuming, Griffith, Maingay.*

A small black densely tufted herb, with creeping tufted stems that send down long rigid roots, and up short stout and stiff or slender flaccid branches. *Leaves* about ¼ in. long, usually densely imbricate. *Pedicels* ½ in. and less, slender. *Calyx* $\frac{1}{10}$–$\frac{1}{8}$ in. long, fruiting not seen. *Corolla* ⅓ in. long.—This may, as Griffith supposed, be referable to *L. sessiliflora,* as some of the specimens have pedicels shorter than the leaves, but its habit is very singular, it is of remarkably small size, and the specimens from all three collectors agree. It closely resembles a West African white-flowered plant found near Nufa on the Niger by Barter.

DOUBTFUL SPECIES.

L. HYSSOPIFOLIA, *Roth Nov. Sp.* 297; is not determinable; it is a Peninsular species, and possibly *L. gratissima* or *racemosa.*

18. **HERPESTIS,** *Gaertn. f.*

Glabrous, often punctate herbs. *Leaves* entire, or toothed, or submersed and multifid. *Flowers* axillary or racemose, yellow blue or white; pedicels bracteolate or not. *Sepals* 5, upper often very large. *Corolla-tube* cylindric; lips spreading, upper the outer in bud, notched or 2-lobed; lower 3-lobed. *Stamens* didynamous, included; anther-cells contiguous, distinct. *Style* dilated at the top and 2-lobed or entire. *Capsule* 2-grooved; valves 2 or 4, separating from an entire column. *Seeds* numerous, very minute. —Species about 50, all warm countries.

The Indian species all belong to the section *Bramia,* with subequal corolla-lobes and stamens, sagittate or didymous anthers, and capitate 2-lobed stigma.

1. **H. Monniera,** *H. B. & K.*; *Benth. Scroph. Ind.* 30, and in *DC. Prodr.* x. 410; creeping, leaves obovate-oblong or spathulate quite entire, peduncles longer than the 2-bracteolate calyx, upper sepal ovate, capsule ovoid acute. *Boiss. Fl. Orient.* iv. 426; *Wall. Cat.* 3900; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 685; *Bot. Mag.* t. 2557. H. spathulata, *Blume Bijd.* 748. Gratiola Monniera, *Linn.*; *Roxb. Cor. Pl.* ii. 41, t. 178, and *Fl. Ind.*, and *Ed. Carey & Wall.* i. 141. Septis repens, *Lour. Fl. Coch.* 392. Bramia indica, *Lamk. Dict.* i. 459.—*Rheede Hort. Mal.* x. t. 14.

Marshes throughout INDIA, ascending to 4000 ft.; from the Punjab to Ceylon and Singapore, common.—DISTRIB. All warm countries.

Quite glabrous, rather succulent; branches 4–10 in. long. *Leaves* ½–¾ in., sessile, obtuse, entire in the Indian plant, nerves very obscure. *Peduncles* usually longer than the leaves. *Calyx* ⅙–⅓ in. long. *Corolla* twice as long, lobes subequal. *Capsule* included. *Seeds* pale, irregular.—Mr. Clarke points out to me that the *Calytriplex obovata,* R. & P. of Peru, cited as a synonym of *H. Monniera* in De Candolle's Prodromus, is, according to the figure of the anthers (overlooked by Bentham), a very different plant.

2. **H. Hamiltoniana,** *Benth. Scroph. Ind.* 30, and in *DC. Prodr.* x. 400; erect, stout, leaves linear-lanceolate entire or subserrate, flowers sessile, upper sepal ovate-cordate, capsule globose. *Wall. Cat.* 3898; *Dalz. & Gibs. Bomb. Fl.* 178. Cardiolophus decussata, *Griff. Notul.* iv. 105, and *Ic. Pl. Asiat.* t. 417, f. 1.

Wet places in northern India; from the PUNJAB, ascending to 3000 ft., MALWAR and the CONCAN, to BENGAL, ASSAM and SILHET.—DISTRIB. Senegal.

Quite glabrous. *Stem* about a span high, usually very stout and much branched. *Leaves* ½–1 in., nerves very obscure. *Calyx* ⅛ in. *Corolla-tube* hardly exceeding the calyx.

3. **H. floribunda,** *Br. Prodr.* 442; erect, leaves linear-lanceolate entire or obscurely toothed, flowers peduncled, sepals membranous outer very broad upper almost orbicular, capsule globose. *Benth. in DC. Prodr.* x. 400; *Roth Nov. Sp.* 289; *Miquel Fl. Ind. Bat.* ii. 684. H. linearis, *Spreng. Syst. Veg.* ii. 802. H. lanceolata, *Wight in Benth. Scroph. Ind.* 30; *Wall. Cat.* 3899. H. amara, *Spanoghe in Linnæa*, xv. 332? Lindernia sesamoides, *Spreng. new entd.* i. 261.

DECCAN PENINSULA; common in wet places from the Concan southwards, and CEYLON.—DISTRIB. Java, Australia, Tropical Africa.

Nearly glabrous. *Stem* a span high and upwards, more slender than in *H. Hamiltoniana*. *Leaves* ½–1 in., sometimes linear, at others contracted into a petiole. *Peduncles* about equalling the calyx, very slender, 2-bracteolate below the top, puberulous, as are the reticulate sepals.

19. GRATIOLA, *Linn.*

Glabrous or glandular-pubescent herbs. *Leaves* opposite, entire or toothed. *Flowers* axillary, solitary, 2-bracteolate. *Sepals* 5, subequal. *Corolla-tube* cylindric; lips spreading, posterior the outer entire or 2-fid; anterior 3-fid. *Stamens*, 2 posterior perfect included, anther-cells distinct; staminodes 2, filiform or 0. *Style* filiform, stigma deflexed dilated or 2-lamellate. *Capsule* ovoid, loculi- and septi-cidal; valves separating from the placentiferous axis. *Seeds* many, small, reticulate.—Species about 20, chiefly of temperate regions.

1. **G. Griffithii,** *Hook. f.*; glabrous, succulent, erect, leaves elliptic-oblong obtuse 3-nerved entire, flowers sessile diandrous, staminodes 0, capsule globose.

UPPER ASSAM, on moist banks; Gabovo, Nam Senna and Noa Dehing, *Griffith* (Kew Distrib. 3915), *Simons*.

Very succulent, branched from the base, 6–10 in. high; branches erect. *Leaves* ½–¾ in., sometimes obscurely sinuate, most minutely punctate; nerves very slender. *Flowers* minute. *Corolla* ⅛ in., yellow, tube scarcely exceeding the linear-oblong sepals; lobes short, rounded. *Anther-cells* parallel, shortly oblong. *Capsule* ⅛ in. diam., membranous. *Seeds* cancellate.—A very interesting plant, as being the only tropical Asiatic representative of the genus.

UNKNOWN SPECIES.

G. CHAMÆDRYS and G. STRIGOSA, *Roth Nov. Sp.* 10, two Peninsular plants of Heyne, are unrecognizable from the descriptions, and no doubt well-known species of other genera.

G. CHAMÆDRIFOLIA, *Lamk. Dict.* iii. 27 (Limnophila chamædrifolia, *G. Don Gen. Syst.* 343, is doubtfully referred by Miquel (Fl. Ind. Bat. ii. 682) to *Limnophila gratissima* Bl. (under *L. punctata* Bl.), of which it may be a small state.

20. DOPATRIUM, *Hamilt.*

Very slender glabrous marsh annuals. *Leaves* few, opposite, lower small, upper pairs remote and minute. *Flowers* small, violet, axillary, solitary; pedicels 0 or filiform, ebracteolate. *Calyx* 5-fid. *Corolla-tube* slender below, throat broad; upper lip the outer, short, 2-fid; lower broad, spreading, 3-lobed. *Stamens*, 2 upper perfect, included; anther-cells parallel, distinct,

equal; staminodes 2, minute. *Style* short, stigma 2-lamellate. *Capsule* small, globose or oblong, loculicidal, valves placentiferous. *Seeds* numerous, very minute, tubercled.—Species 5, African, Asiatic and Australian.

1. **D. nudicaule,** *Ham. in Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; very slender, 2–4 in. high, bracts minute acuminate, calyx-lobes acuminate, capsule linear-oblong, pedicel deflexed. Gratiola nudicaulis, *Willd. in Act. Berol.* iv. 192. G. aphylla, *Roth Nov. Sp.* 7. G. cuneifolia, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 142.

South Deccan; *Heyne*, &c. Ceylon; not uncommon.—Distrib. Java, Philippine Islands.

Stem simple or branched from the base. *Leaves*, radical 0, or very few, $\frac{1}{10}$–$\frac{1}{3}$ in. long, oblong, obtuse; cauline few, minute. *Corolla* $\frac{1}{3}$ in. long. *Capsule* $\frac{1}{4}$ in.

2. **D. junceum,** *Ham. in Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; stem 6–10 in., bracts minute obtuse, calyx-lobes oblong obtuse, corolla $\frac{1}{6}$ in., capsule globose. *Dalz. & Gibs. Bomb. Fl.* 178; *Griff. Notul.* iv. 102, and *Ic. Pl. Asiat.* t. 418, f. 6; *Miquel Fl. Ind. Bat.* ii. 686. Gratiola juncea, *Roxb. Cor. Pl.* ii. 16, t. 129, and *Fl. Ind.*, and *Ed. Wall. & Carey*, i. 142; *Wall. Cat.* 3892. Morgania juncea, *Spreng. Syst.* ii. 803.

Throughout India from the Upper Gangetic plain southwards and eastwards to Assam, Burma, and Ceylon.—Distrib. Malay Islands, China, Japan, Philippines, Australia.

Rather fleshy, branched from the base. *Leaves*, radical 0 or few, oblong, obtuse, sometimes 2 in. long, nerves parallel; cauline smaller, in distant pairs. *Flowers* in very distant pairs, rose coloured, sessile or on capillary pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. erect in fruit. *Capsule* $\frac{1}{8}$ in. diam.

3. **D. lobelioides,** *Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; stem 6–18 in., bracts minute obscure, calyx-lobes very short obtuse, corolla $\frac{1}{3}$ in., capsule globose. *Wight Ic.* t. 859. Gratiola lobelioides, *Retz Obs.* iv. 7; *Roxb. Fl. Ind.* i. 142; *Wall. Cat.* 3893. G. hyssopioides, *Roxb. Cor. Pl.* ii. t. 128, and *Fl. Ind.* i. 141, and *Ed. Wall. & Carey*, i. 142 (*not of Cor. Pl.* iii. t. 203).

South Deccan, *Heyne*, &c. Ceylon.

Stem stout and fleshy below, sometimes as thick as a goose-quill above and branches very slender. *Leaves*, lower 2–4 pairs obovate-oblong, obtuse, $\frac{1}{4}$–2 in. long, upper very few distant and small; nerves parallel, very obscure. *Flowers* subracemose, in distant pairs; pedicels capillary, $\frac{1}{3}$–1 in., spreading in fruit. *Capsule* $\frac{1}{6}$ in. diam.

21. ARTANEMA, *Don.*

Erect herbs, angles of stems and leaves above scabrid. *Leaves* opposite, entire or serrate. *Flowers* large, blue, racemose, ebracteolate; bracts foliaceous. *Sepals* 5, acuminate, bare, much dilated. *Corolla-tube* long, broad; upper lip the outer, erect, broad, notched; lower spreading, 3-fid. *Stamens* 4, didynamous, 2 posterior short, included; 2 anterior with long arching filaments dilated at the base; cells confluent at their tips. *Stigma* 2-lamellate. *Capsule* globose, septicidal; valves entire, separating from the placentiferous axis. *Seeds* rugose.—Species 4, tropical Asiatic, Australian and African.

1. **A. sesamoides,** *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 408; leaves lanceolate more or less petioled, corolla $\frac{3}{4}$ in. long, tube broad. *Wight Ic.* t. 1410; *Dalz. & Gibs. Bomb. Fl.* 181; *Miquel Fl. Ind. Bat.* ii. 686. Columnea longifolia, *Linn. Mant.* 90. Achimenes sesamoides, *Vahl Symb.*

ii. 71. Diceros longifolius, *Pers. Syn.* ii. 164; *Blume Bijd.* 751; *Wall. Cat.* 3884.—*Rheede Hort. Mal.* ix. t. 87.

DECCAN PENINSULA; on the west side, from the Concan southwards. MALAY PENINSULA; from Tenasserim southwards. CEYLON; common, ascending to 3000 ft. —DISTRIB. Sumatra, Java, Philippine Islands, Borneo; Tropical Africa?

A tall herb, 2–3 ft., sparingly branched. *Leaves* 2–4 in., acuminate, entire or serrate. *Pedicels* equalling or exceeding the calyx, which varies from $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Corolla* lilac. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.—A tropical Eastern African plant from Zanzibar seems the same, except that the upper leaves are more amplexicaul. A Western African plant more similar in the leaves has crimson flowers.

2. **A. angustifolium,** *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 408; leaves sessile narrowly lanceolate or linear-lanceolate, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. long, tube narrow. Diceros angustifolius, *Wall. Cat.* 3885.

SINGAPORE; *Wallich, Cuming.*

Very near to *A. sesamoides*, but the leaves are much narrower, the pedicels usually shorter, and flowers much smaller.

22. **CURANGA,** *Juss.*

Diffuse or creeping herbs. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; pedicels opposite, bracteate, ebracteolate. *Sepals* 4, spreading, upper and lower very large, much enlarged in fruit, lateral small, narrow. *Corolla-tube* short, upper lip broad, arched, notched; lower longer, spreading, 3-fid. *Stamens*, 2 upper perfect, included; anthers cohering, cells divaricate; staminodes 2, clavate. *Stigma* 2-lamellate. *Capsule* orbicular, included in the much enlarged calyx, septicidal, valves separating from the broad placentiferous axis. *Seeds* numerous, rugose.—Species 2, Indian and Malayan.

C. amara, *Juss. in Ann. Mus.* ix. 320; *Benth. in DC. Prodr.* x. 408. Caranga amara, *Vahl Symb.* i. 100. Gratiola amara, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 136. Herpestis amara, *Benth. Scroph. Ind.* 30. Synphillium torenioides, *Griff. in Madr. Journ. Nat. Sc.* iv. 1, t. 11. Tristeria assamica, *Griff. Notul.* iv. 111.—*Rumph. Herb. Amb.* v. t. 170, f. 1.

SIKKIM HIMALAYA, alt. 3000 ft., *Clarke.* ASSAM and MISHMI, *Griffith.* CACHAR, *Keenan.* CHITTAGONG, *Clarke.* TENASSERIM; at Mergui, *Griffith.*—DISTRIB. Borneo, Philippine Islands, Amboyna.

Annual, glabrous. *Branches* slender, straggling, divaricate, rooting at the lower nodes, 2–3 ft. long. *Leaves* 2–2$\frac{1}{2}$ in., obtuse or acute; petiole $\frac{1}{4}$ in., slender. *Racemes* short, few-fld.; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* in flower $\frac{1}{4}$ in., in fruit $\frac{1}{2}$ in.; outer sepals broadly ovate-cordate, membranous, reticulate. *Corolla* red-brown. *Capsule* $\frac{1}{6}$ in. diam., compressed.—Foliage very bitter.

23. **TORENIA,** *Linn.*

Glabrous or pubescent herbs. *Leaves* opposite, entire crenate or serrate. *Flowers* axillary or in terminal or pseudo-axillary umbels or racemes; pedicels ebracteolate. *Calyx* tubular, 3–5-winged or plaited or keeled, 2-lipped, or 3–5-toothed. *Corolla-tube* cylindric, dilated above; upper lip erect, concave, notched or 2-fid; lower larger, spreading, 3-lobed. *Stamens*, 4 perfect, 2 upper included, 2 lower appendaged at the base and conniving under the upper lip; anthers touching or cohering in pairs, cells often confluent. *Stigma* 2-lamellate. *Capsule* linear or oblong, included, septicidal; valves separating from the flat placentiferous axis. *Seeds* numerous, rugose

or cancellate.—Species 20, tropical Asiatic and African, one of them also American.

The species 4 to 8 are imperfectly characterized, and are very difficult of discrimination in the dried state.

SECT. I. **Tridens.** *Fruiting calyx* suborbicular, broadly winged.

1. **T. polygonoides,** *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 409; creeping, glabrous, leaves petioled $\frac{1}{3}$–$\frac{1}{2}$ in. orbicular-ovate serrate, peduncles axillary 2–4-fld. *Miquel Fl. Ind. Bat.* ii. 688. T. cardiosepala, *Benth. l. c.* Herpestis polygonoides, *Benth. in Wall. Cat.* 3897.

CACHAR, *Keenan.* TENASSERIM; at Tavoy, *Wallich.* SINGAPORE, PENANG and MALACCA, *Griffith,* &c. Bouton told me PENANG (*Miquel*).—DISTRIB. Borneo, Philippine Islands.

A slender straggling herb, branches 6–10 in. *Corolla* $\frac{1}{3}$ in. diam., white and red. *Fruiting calyx* $\frac{1}{3}$ in. long, as long as the pedicel. *Capsule* ovate-lanceolate.

2. **T. mucronulata,** *Benth. in DC. Prodr.* x. 409; creeping, pubescent, leaves petioled $\frac{1}{2}$–$\frac{3}{4}$ in. ovate acute serrate, peduncles axillary 1–4-fld.

TENASSERIM; at Mergui, *Griffith.*

Very similar indeed to *T. polygonoides,* but pubescent, with rather larger leaves.

SECT. II. **Nortenia.** *Calyx* oblong ellipsoid or linear-oblong, fruiting keeled or winged (often cordate in outline in *T. cordifolia*).

* *Flowers axillary, solitary or 2-nate, or subumbellate at the ends of the branches.*

3. **T. cordifolia,** *Roxb. Cor. Pl.* ii. 52, f. 161, and *Fl. Ind.* iii. 95; suberect, sparsely hairy, leaves petioled ovate serrate, pedicels axillary and subumbellate fruiting slender, fruiting calyx $\frac{1}{2}$ in. ovoid or oblong winged, base rounded or cordate not decurrent, corolla $\frac{3}{4}$ in. long pale blue, lower filaments toothless. *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 409, *in part*; *Bot. Mag.* t. 3715; *Dalz. & Gibs. Bomb. Fl.* 180.

WESTERN HIMALAYA; from Simla to Kumaon, ascending to 6000 ft. CENTRAL INDIA, BEHAR, on Parusnath. The CIRCARS, the CONCAN, PEGU and TENASSERIM.—DISTRIB. Java, China.

Annual, nearly glabrous, 4–8 in. high, usually erect and trichotomously branched from the base; stem and branches almost 4-winged. *Leaves* 1–1$\frac{1}{2}$ in., glabrous; base cuneate very rarely cordate, petiole rarely as long as the blade. *Pedicels* often longer than the leaves.—Clarke remarks that Bentham describes the filaments as toothed, but that he has never found them so, and that Roxburgh's figure represents them as toothless. *Rheede's Hort. Mal.* ix. t. 68, must be a very different plant. Wight's *T. cordifolia* from Courtallum with long decumbent stems 12–18 in. long, short petioles, and long axillary pedicels seems hardly the same species, but I cannot satisfactorily identify it with any other.

4. **T. peduncularis,** *Benth. in Wall. Cat.* 3956; suberect, sparsely hairy, much branched, leaves petioled ovate crenate-serrate, pedicels axillary and subumbellate fruiting thickened, fruiting calyx $\frac{3}{4}$ in. ovoid or oblong winged, base acute decurrent, corolla $\frac{3}{4}$ in. pale blue, lower filaments toothless or minutely toothed. T. edentula, *Benth. in DC. Prodr.* x. 410, *not of Griffith,* and T. asiatica, *Scroph. Ind.* 38, *in part*; *Bot. Mag.* t. 4229. ? T. exappendiculata, *Regel Gartenfl.* t. 892. T. alba, *Hb. Ham.*; *Wall. Cat.* 3961.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*; Sikkim, ascending to 7000 ft. KHASIA MTS., ASSAM and SILHET; PENANG, *Schomburgk.*—DISTRIB. Java, Philippine Islands.

Closely resembles a large state of *T. cordifolia* in habit and foliage, but the calyx is longer and narrower, with the wings produced on the pedicel, never cordate at the base, and the capsule is longer and narrower. The plate in *Bot. Mag.* is very characteristic. Hamilton's *T. alba* is, I assume, a white-fld. variety.

5. **T. asiatica,** *Linn.*; *Wight Ic.* t. 862; nearly glabrous or pubescent, diffuse, creeping below, leaves shortly petioled ovate-cordate or -lanceolate serrate, pedicels axillary and subumbellate fruiting thickened, fruiting calyx 1 in., narrowly oblong keeled hardly winged, base decurrent, corolla 1¼–1½ in. blue with very dark violet lateral lobes, longer filaments toothed. *Benth. in DC. Prodr.* x. 410; *Wall. Cat.* 3953 A. B.; *Miquel Fl. Ind. Bat.* ii. 689; *Gaertn. Fruct.* iii. 29, t. 184; *Lamk. Ill.* t. 523; *Bot. Mag.* t. 4249; *Lem. Ill. Hortic.* t. 199; *Fl. de Serres* ii. *fasc.* x. t. 5, and xiii. t. 1342. Treisteria cordata, *Griff. Notul.* iv. 109.—*Rheede Hort. Mal.* ix. t. 53.

WESTERN PENINSULA; Nilgherry Mts., *Wight,* &c. TENASSERIM; at Mergui, *Griffith.* CEYLON, abundant.—DISTRIB. Java, China.

Diffusely branched; branches 6–10 in. long, slender. *Leaves* 1½–2 in., larger and usually more acuminate than in the allied species; petiole rarely more than ½ in. *Fruiting calyx* narrowly winged or keeled.

VAR. *hirsuta*; more pubescent, lower filaments with a very small tooth. T. hirsuta, *Benth. in DC. Prodr.* x. 410; *Bot. Mag.* t. 5167. T. cordifolia, *Benth. in Wall. Cat.* 3954, *not of Roxb.* ? *Lamk. Ill.* t. 523, f. 2.—Nilgherry Mts.

VAR. *concolor*; corolla of a uniform dark blue. T. concolor, *Lindl. in Bot. Reg.* 1846, t. 62. T. longiflora, *Morren in Ann. de Gand.* ii. 441, 471.

VAR. ? *parvifolia*; leaves much smaller longer petioled less acuminate, petiole often as long as the blade. T. asiatica, *Thwaites Enum.* 219.—Nilgherry Mts. and Ceylon. This closely resembles *T. bicolor* in habit and foliage, and is, I suspect, specifically distinct from *T. asiatica.*

6. **T. vagans,** *Roxb. Cat.* 1813, and *Fl. Ind.* iii. 96; nearly glabrous, erect or decumbent, diffusely branched, rooting at the lower nodes, leaves ¾–1 in. all shortly petioled, pedicels scattered axillary fruiting thickened, fruiting calyx ½–¾ in. narrowly linear-oblong keeled not winged, corolla ¾ in. pale blue, lobes small, longer filaments toothed. T. diffusa, *Don Prodr.* 86; *Wall. Cat.* 3953. T. asiatica, *Wall. Cat.* 3953, *in part*; *Griff. Notul.* iv. 123. T. hians, *Roxb. Fl. Ind.* iii. 96. T. rubens, *Benth. l. c.* ? Peristeira grandiflora, *Griff. Notul.* iv. 118. Columnea diffusa, *Roxb. mss.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, ascending to 4000 ft. ASSAM and KHASIA MTS., common; CHITTAGONG, *Clarke.* NILGHERRIES; Conoor, alt. 5000 ft., *Clarke.*—DISTRIB. China.

Except by the usually more diffuse habit, the not winged calyx and the always toothed longer filaments, I do not see how this can well be distinguished from *T. peduncularis.* The flowers are much smaller than in *T. asiatica* and of a more uniform blue, and the leaves also are smaller. I cannot distinguish *T. rubens* as a variety; the characters assigned to it are the short obtuse tooth of the longer filaments, and often red tips to the calyx teeth.

7. **T. hirtella,** *Hook. f.*; pubescent, very slender, diffusely branched, leaves ½–1 in. very shortly petioled upper usually sessile ovate or ovate-cordate subacute serrate, pedicels solitary axillary fruiting slender, fruiting calyx ½ in. narrowly oblong keeled not winged, corolla ½ in., longer filaments with an obtuse tooth. T. rubens *var.* hirtella, *Benth. in Hohen. Pl. Nilg.* 1156, 1157. T. rubens, *Thwaites Enum.* 219.

NILGHERRY MTS., *Hohenacker.* CEYLON; *Gardner,* &c., ascending to 2000 ft.

A very distinct species, at once recognizable by the very slender habit and small very shortly petioled leaves. The corolla is small, with short lobes. Thwaites suspects

that this is only a form of *T. asiatica*; if so, they are united by var. *parvifolia* of the latter.

8. **T. bicolor,** *Dalz. in Hook. Kew Journ.* iii. 38; sparsely hairy or glabrous, diffusely branched, leaves ½–1 in. long-petioled broadly ovate-cordate or rounded crenate-serrate, peduncles axillary fruiting thickened, fruiting calyx ½–¾ in. very narrow keeled not winged, corolla 1 in. dark blue, longer filaments toothed at the base. *Dalz. & Gibs. Bomb. Fl.* 181. T. asiatica, *Herb. Wight* n. 2205, 5986.—Torenia n. sp., *Miquel in Pl. Hohenack.* n. 61.

The CONCAN, near Vingorla, *Dalzell,* &c. CANARA, *Hohenacker.* MALABAR, *Wight* (T. asiatica, *Kew Distrib.* 2379).

This again, though difficult to define by words, appears to be a very distinct species with the small leaves and straggling habit of *T. asiatica* var. *parvifolia,* the petiole being often as long as the blade. The fruiting pedicels are much thickened, and the calyx is very narrow.—A drawing from Stock's collection represents the flowers as red-purple, but they are described in the Bombay Flora as deep violet with a white under lip.

9. **T. parviflora,** *Ham. in Wall. Cat.* 3958; glabrous, erect or diffuse, branching from the base, leaves all petioled ½–1 in. ovate or ovate-lanceolate acute serrate, pedicels axillary 2–4 at the nodes shorter than the leaves fruiting thickened, fruiting calyx ½ in. narrowly oblong-lanceolate keeled not winged, corolla ⅓–½ in. blue, longer filaments minutely toothed. *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 410; *Miquel Fl. Ind. Bat.* ii. 689; *Schmidt in Mart. Fl. Bras. Fasc.* xxx. 322, t. 56, f. 1. ? Peristeira dichotoma, *Griff. Notul.* iv. 119. Nortenia Thomassii, *Cham. & Schl. in Linnæa,* iii. 18.

ASSAM, *Masters.* KHASIA MTS., ascending to 4000 ft., *J. D. H. & T. T.* TENASSERIM; at Tavoy and Moulmein, *Wallich,* &c.—DISTRIB. Java, China, Tropical Africa and America.

Annual, three to eight inches high; branches often decumbent below, and rooting at the nodes. *Leaves* abruptly narrowed into a petiole ⅓–¼ in. long. *Pedicels* sometimes very short, erect or spreading.—This has the short pedicels of *T. ciliata* and *flava.*

** *Flowers axillary and racemed at the ends of the branches.*

10. **T. flava,** *Ham. in Wall. Cat.* 3957 A. B.; erect or decumbent, sparsely patently hairy or glabrous, leaves sessile or petioled ovate or oblong-ovate obtuse entire or crenate, pedicels usually shorter than the calyx fruiting thickened, flowers axillary and in distant pairs, fruiting calyx ½–¾ in. elliptic-lanceolate keeled not winged deeply channelled, corolla ¾–1½ in. yellow, longer filaments minutely toothed. *Benth. Scroph. Ind.* 38, and in *DC. Prodr.* x. 414; *Miquel Fl. Ind. Bat.* ii. 689; *Bot. Mag.* t. 6700. T. Bailloni, *Godefr. in Ill. Hortic.* xxv. t. 324; *E. Morren in Belgique Hortic.* xxix. t. 1, f. 2. Peristeira racemosa, *Griff. Notul.* iv. 120. Mimulus hirsutus, *Blume Bijd.* 756.

ASSAM, *Masters,* &c. KHASIA MTS., ascending to 2000 ft., *J. D. H. & T. T.* SILHET and CACHAR, *Wallich,* &c. TENASSERIM, *Lobb, Parish.*—DISTRIB. Sumatra, Siam, China.

Stem usually robust and branched from the base, 6–10 in. high, and branches strict. *Leaves* 1–1½ in., narrowed into the petiole. *Corolla* yellow, ½–¾ in., with a purple eye.—In cultivation the stem becomes decumbent and rooting, the flowers axillary and solitary, and the corolla large (see Bot. Mag. t. 6700).

11. **T. ciliata,** *Smith in Rees' Cyclop.* v. 36; erect, patently hairy, leaves sessile or petioled ovate or oblong-ovate obtuse entire or crenate,

pedicels longer than or equalling the calyx fruiting thickened, flowers in distant pairs, fruiting calyx $\frac{1}{2}$–$\frac{3}{4}$ in. elliptic-lanceolate winged, corolla $\frac{2}{3}$ in. blue. *Benth. in DC. Prodr.* x. 411; *Miquel Fl. Ind. Bat.* ii. 689. T. racemosa, *Benth. Scroph. Ind.* 38, *not of Griff.* T. flava, *Wall. Cat.* 3957 c. T. cœrulea, *Miquel Fl. Ind. Bat. Suppl.* 562.

PENANG, *Wallich.*

Very similar to *T. flava,* but the fruiting calyx is winged, and the corolla blue.

DOUBTFUL SPECIES.

T. EDENTULA, *Griff. in Madr. Journ. Sc.* iv. 4. "Suberect, softly hirsute, leaves petioled ovate-cordate subrugose, flowers pseudo-axillary fascicled and racemed, corolla usually pale blue with yellow spots."—Upper Assam at Suddya, *Griffith.* Bentham (in DC. Prodr.) refers his *T. peduncularis* (Scroph. Ind.) to this, but Griffith's character of softly hirsute is irreconcilable. It may be *Vandellia mollis.*

TORENIA ?—*Tresteira lanceolata,* Griff. Notul. iv. 111, t. 458, f. 6, from Mergui, with terete pubescent stems suffruticose below, is undeterminable.

24. **VANDELLIA,** *Linn.*

Herbs, usually annual, glabrous or pubescent. *Leaves* opposite, often toothed, penninerved (except in *V. erecta*). *Flowers* small, axillary or racemose; pedicels ebracteolate. *Sepals* 5, free or connate in a subcampanulate calyx, angles not winged. *Corolla-tube* cylindric; upper lip erect, broad, concave, notched or bifid; lower broader, spreading, 3-lobed. *Stamens* 4, all perfect (except V. *mollugimoides*); 2 posterior usually included; 2 anterior with arched filaments appendaged at or towards the base; anthers touching or cohering in pairs under the upper lip, cells divaricate. *Stigma* 2-lamellate. *Capsule* septicidal, valves separating from the placentiferous septum. *Seeds* rugose.—Species about 30, chiefly tropical Asiatic.

* Capsule about equalling the calyx in length, or shorter.

† *Calyx in flower 5-cleft to the middle or above it.*

1. **V. crustacea,** *Benth. Scroph. Ind.* 35, and in *DC. Prodr.* x. 413; diffusely branched, glabrous or sparsely hairy, leaves shortly petioled ovate or lanceolate, pedicels axillary or subracemose, calyx shortly 5-lobed exceeding the oblong-ovate obtuse capsule. *Dalz. & Gibs. Bomb. Fl.* 180; *Wight Ic.* t. 863; *Miquel Fl. Ind. Bat.* ii. 690. V. alba, *Benth. Scroph. Ind.* 35. Torenia varians, *Roxb. Fl. Ind.* iii. 96. T. lucida, *Ham. in Wall. Cat.* 3962. T. alba, *Ham. in Wall. Cat.* 3261, *in part.* T. flaccida, *Br. Prodr.* 440. Gratiola lucida, *Vahl Enum.* i. 95. ? *Roxb. Cor. Pl.* ii. 2, t. 202, and *Fl. Ind.*, and *Ed. Carey & Wall.* i. 138. G. aspera, *Roth Nov. Pl.* 11. Peristeira paniculata, *Griff. Notul.* iv. 119. Capraria crustacea, *Linn. Mant.* 87. Morgania lucida & aspera, *Spreng. Syst.* ii. 802, 803. Mimulus javanicus, *Blume Bijd.* 283. Hornemannia ovata, *Link & Otto Ic. Pl. Sel.* i. 9, t. 3. Tittmannia ovata, *Reichb. Ic. Exot.* i. p. 27. Antirrhinum hexandrum, *Forsk. Fl. Æg. Arab.* 43.—*Rumph. Herb. Amb.* v. t. 170, f. 3.

Throughout INDIA and CEYLON, a weed.—DISTRIB. Tropics of the Old World; rare (introduced ?) into the New.

Stem excessively trichotomously branched from the root, 4–18 in. high. *Leaves* $\frac{1}{4}$–1 in., entire or serrate. *Pedicels* $\frac{1}{2}$–1$\frac{1}{2}$ in., slender, strict. *Calyx* $\frac{1}{10}$ in. long in flower, $\frac{1}{8}$ in fruit.—The citation of Roxburgh's *Gratiola lucida* is doubtful; if correct, Roxburgh's figure of the filaments, where the appendages are omitted, is faulty.

2. **V. mollugimoides,** *Benth. Scroph. Ind.* 35, and in *DC. Prodr.*

x. 413; glabrous, except the ciliate leaf-axils and calyx, leaves subsessile ovate-lanceolate or oblong base cuneate or rounded margins scabrid, pedicels rigid umbellately fascicled rather longer than the calyx which is 5-cleft to the middle in flower, sepals free in fruit longer than the ovate-oblong capsule. Torenia mollugınoides, *Benth. in Wall. Cat.* 3960.

BURMA; Mts. of Prome, *Wallich.* PEGU, *Kurz.* TENASSERIM; at Moulmein, *Lobb, Parish.*

A slender laxly branched herb, 1–1$\frac{1}{2}$ foot high, with the habit of a *Mollugo* or *Holosteum.* *Leaves* $\frac{1}{2}$ in. long, margin thickened, obsoletely crenate. *Pedicels* often deflexed in fruit. *Calyx* $\frac{1}{6}$ in. long in fruit. Longer *filaments* with a very short obtuse tooth, according to Bentham.—In Moulmein specimens I find 2 perfect stamens, and 2 filiform staminodes hooked near the top.

3. **V. Hookeri,** *Clarke mss.*; diffusely branched, softly hairy all over, leaves sessile or petioled ovate or lanceolate serrate, pedicels axillary and subumbellate at the ends of the branches about as long as the calyx which is 5-cleft to the middle in flower, sepals free or not in fruit hispidly hairy much longer than the oblong capsule.—Torenia, n. 10 *Herb. H.f. & T.*

SIKKIM TERAI; at Siligoree, *Clarke.* KHASIA MTS.; in cultivated fields at Pomrang, &c., *J. D. H. & T. T.* PEGU, *Kurz.* BEHAR; at Parusnath, *Thomson, Clarke.*

Branched from the base; the branches divaricate and do not root, are rather robust, 4–8 in. high. *Leaves* $\frac{3}{4}$–1 in. hairy on both surfaces. *Pedicels* spreading. *Calyx* $\frac{1}{4}$–$\frac{1}{2}$ in. long. *Corolla* blue-purple.—Very near *V. molluginoides,* but larger, with much larger flowers, and leaves with margins not thickened.

†† *Sepals in flower free to the base or nearly so.*

4. **V. elata,** *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; slender, suberect or diffuse, glabrous or sparsely hairy, leaves petioled ovate coarsely crenate-toothed, flowers racemose, sepals narrowly lanceolate equalling the broadly oblong capsule. Tittmannia elata, *Benth. in Wall. Cat.* 3944.

TENASSERIM; at Tavoy, *Gomez*; Moulmein, *Lobb, Helfer.*

Stem simple or 3-chotomously branched, 6–10 in. high. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in.; petiole half as long. *Pedicels* 2–3 times as long as the fruiting sepals, spreading or deflexed, lower with leafy upper with small lanceolate bracts. *Calyx* $\frac{1}{12}$ in. long, fruiting $\frac{1}{8}$ in. *Corolla* very minute, hardly exceeding the calyx.

5. **V. multiflora,** *G. Don Gen. Syst.* iv. 549; erect, succulent, glabrous, leaves sessile or narrowed into a petiole oblong or ovate-oblong or obovate obtuse entire or sinuate, flowers racemed, pedicels exceeding the calyx, sepals lanceolate shorter than the orbicular capsule. *Benth. in DC. Prodr.* x. 414. V. erecta, *Benth. Scroph. Ind.* 36, *in part.* Torenia multiflora, *Roxb. Fl. Ind.* iii. 96. Tittmannia trichotoma, *Benth. in Wall. Cat.* 3943.

Plains of BENGAL, not uncommon.

Stem trichotomously branched, 4–6 in. *Leaves* in few pairs, 1–2 in., sometimes spathulate. *Racemes* usually many-fld.; flowers minute. *Calyx* $\frac{1}{16}$ in. long, fruiting $\frac{1}{10}$ in.

6. **V. hirsuta,** *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; erect, succulent, sparsely clothed with spreading hairs, lower leaves petioled ovate or oblong obtuse entire or sinuate upper sessile broader, flowers racemed, pedicels exceeding the calyx, sepals lanceolate longer than the orbicular capsule. *Dalz. & Gibs. Bomb. Fl.* 179. V. multiflora, *Herb. Ind. Or. H.f. & T. in part.* Tittmannia ovata, *Benth. in Wall. Cat.* 3942. T. vis-

cosa, *Reichb. Ic. Exot.* i. 26, t. 38. Tittmannia sp. n. 3, *Griff. Notul.* iv. 117. Hornemannia prostrata, *Jacq. Ecl.* t. 150.

EASTERN and SOUTHERN INDIA; from Bengal and Sikkim to Ava, and throughout the Deccan Peninsula. CEYLON, near Kornegalle, *Thwaites.*—DISTRIB. Java, Borneo, China, Philippine Islands.

Very similar in habit, foliage and inflorescence to *V. multiflora*, but always hairy. *Corolla* blueish white, according to *Griffith*.

7. **V. scabra,** *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; diffusely branched, more or less clothed with long white spreading hairs, leaves subsessile broadly ovate or ovate-cordate serrate or entire, pedicels axillary and terminal much longer than the calyx, sepals lanceolate hirsute or glabrous equalling the orbicular capsule. *Miquel Fl. Ind. Bat.* ii. 692; *Griff. Notul.* iv. 122, and *Ic. Pl. Asiat.* t. 418, f. 4. V. monnierioides, *Ham. mss.* Torenia hirta, *Cham. & Schl. in Linnæa,* ii. 571. T. globosa, *Ham. mss.* Gratiola pusilla, *Willd. Sp. Pl.* i. 105. Columnea minuta, *Roxb. Fl. Ind.* iii. 98. Tittmannia pusilla, *Benth.*, and T. sulcata, *Hb. Wight, in Wall. Cat.* 3945, 3946 (both in part only). Bonnaya Vahlii, and Stemodia minuta, *G. Don Gen. Syst.* iv. 538 & 542. Selago pusilla, *Thunb. Prodr. Pl. Cap.* 99.

TROPICAL INDIA, and in CEYLON; in rice-fields, &c., abundant.—DISTRIB. Java, Borneo, China, Philippine Islands, S. Africa, Madagascar.

Stem slender and branches 2–4 (rarely 6–8) inches high, rather rigid. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in., sometimes orbicular, acute or obtuse. *Pedicels* capillary, $\frac{1}{2}$–$1\frac{1}{2}$ in., strict, spreading in fruit. *Corolla* about $\frac{1}{3}$ in. long, three times as long as the calyx.

VAR. *laxa*; stem elongate very slender dichotomously branched. V. laxa, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; *Dalz. & Gibs. Bomb. Fl.* 179. Tittmannia pusilla, *Benth. in Wall. Cat.* 3945 C.—Deccan Peninsula, *Wight*; Vingorla (*Dalz. & Gibs.*).—This is, I think, only a drawn up state of *V. scabra*, and hardly even a variety. I have seen no specimen from Vingorla.

8. **V. mollis,** *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 414; procumbent, softly villous all over, leaves shortly petioled ovate or ovate-oblong crenate-serrate, pedicels axillary or in axillary or terminal racemes much longer than the calyx, sepals subulate hirsute longer than the oblong capsule. Tittmannia hirta, *Benth. in Wall. Cat.* 3948.

SIKKIM HIMALAYA, alt. 3–4000 ft., *J. D. H.*, &c. ASSAM, SILHET and the KHASIA MTS., ascending to 3000 ft.—DISTRIB. S. China.

Stem creeping below, 6–18 in. long, sometimes robust. *Leaves* 1–$1\frac{1}{2}$ in., villous on both surfaces, petiole $\frac{1}{6}$ in. or 0. *Pedicels* very slender, $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* sometimes nearly $\frac{1}{2}$ in. long. *Corolla* with a brown upper and yellow lower lip. *Filaments* hairy at the base, with a process.

9. **V. erecta,** *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 415; erect, quite glabrous, leaves sessile elliptic or oblong obtuse 3–5-nerved entire or obscurely crenate, pedicels axillary longer than the leaves and the sepals, sepals lanceolate or linear rather shorter than the ovoid-orbicular capsule. *Maxim. Diagn. Pl. Nov. Dec.* xix. 413. V. pyxidaria, *Maxim. l. c.* 419; *Boiss. Fl. Orient.* iv. 427. Tittmannia erecta, *Benth. in Wall. Cat.* 3947. Lindernia pyxidaria, *All.*; *Benth. in DC. Prodr.* x. 418; *Gaertn. Fruct.* iii. 34, t. 184, f. 8; *Reichb. Ic. Fl. Germ.* t. 1723; *Lamk. Ill.* t. 522. L. Kitaibelii, *G. Don Gen. Syst.* iv. 557. Ilysanthes gratioloides, *Regel Fl. Usur.* n. 359, *not of Benth.* (*ex Maxim. l. c.* 420). Gratiola inundata, *Kit. in Schultz Fl. Austr.* ii. 32. G. integrifolia, *Roxb. Fl. Ind.* i. 137, and *Ed. Carey & Wall.* i. 138.—*Rheede Hort. Mal.* ix. t. 57.

Throughout INDIA; from Kashmir to Assam, Tenasserim and the S. Deccan (not

recorded from Ceylon).—DISTRIB. Siam, China, Japan, Malay and Polynesian Islands, and westwards to France.

Branched from the base; branches divaricate, not rooting, 4–8 in. high. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. *Pedicels* very slender, usually twice as long as the leaves. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in. long, rather obtuse.—Closely resembles *Ilysanthes parviflora*. So common a plant as this is cannot have escaped the notice of Roxburgh, and I think it must be his *Gratiola integrifolia*. Maximovicz has discussed at length the variations exhibited by this plant, and its passage into the northern *Lindernia pyxidaria*, in which the flowers are sometimes cleistogamous, the filaments straight and sometimes not appendaged. The Indian forms should be carefully studied.

** Capsule much longer than the calyx.

10. **V. nummularifolia,** *Don Prodr.* 86; erect, quite glabrous, leaves sessile or shortly petioled ovate orbicular or obovate obtuse crenate-serrate, pedicels axillary and in subumbellate or few-fld. racemes longer than the leaves, calyx 5-toothed fruiting shorter than the ellipsoid acuminate capsule. *Benth. in DC. Prodr.* x. 416.

SUBTROPICAL HIMALAYA, alt. 2–7000 ft., from Kashmir to Sikkim. KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T.*

Simple or branched from the base, the branches not rooting, divaricate, 4–6 in. high. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., often as broad as long, nerves subflabellate. *Pedicels* $\frac{1}{3}$–$\frac{2}{3}$ in., very slender. *Calyx* $\frac{1}{8}$ in. long, cleft to the middle, teeth acute, irregularly cleft to the base in fruit. *Corolla* red-purple, lateral lobes of lip white. Lower *filaments* with a broad obtuse tooth. *Capsule* nearly $\frac{1}{4}$ in.

11. **V. sessiliflora,** *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* 416; erect, glabrous or puberulous, leaves sessile rounded or broadly ovate crenate-serrate, flowers sessile or very shortly pedicelled, calyx 5-toothed fruiting shorter than the ellipsoid acute capsule. V. minima, *Benth. Scroph. Ind.* 37. Torenia sessiliflora, *Benth. in Wall. Cat.* 3959.

SUBTROPICAL HIMALAYA, alt. 2–7000 ft., from Kashmir to Mishmi. KHASIA MTS., alt. 2–4000 ft. AVA, *Wallich*. BEHAR; on Parusnath, *J. D. H.*, *Clarke.*

Probably a sessile-flowered form of *V. nummularifolia*, from which the short pedicels alone distinguish it in a dried state.

12. **V. pedunculata,** *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 416; glabrous, branches long procumbent, leaves shortly petioled ovate obscurely crenate-toothed, pedicels axillary much longer than the leaves and in terminal racemes, sepals free to the base half as long as the linear-lanceolate capsule. *Dalz. & Gibs. Bomb. Fl.* 179; *Griff. Notul.* iv. 120, and *Ic. Pl. Asiat.* t. 418, f. 2. V. Roxburghii & cordifolia, *G. Don Gen. Syst.* iv. 549. Gratiola cordifolia, *Vahl Enum.* i. 97; *Don Prodr.* 85. Bonnaya cordifolia, *Spreng. Syst.* i. 42. Tittmannia grandiflora, *Benth. in Wall. Cat.* 3949. Torenia diffusa, *Roxb. Fl. Ind.* ii. 95. T. varians, *Griff. Notul.* iv. 125, *not of Roxb.*

Throughout INDIA, and in CEYLON; abundant in rice-swamps.—DISTRIB. Borneo, China, Cochin-China.

Stem sometimes creeping at the base, branches 4–10 in., slender, prostrate. *Leaves* $\frac{1}{2}$–1 in., obtuse or subacute. *Pedicels* twice as long as the leaves, sometimes $1\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., narrowly lanceolate. *Corolla* white, or pale blue with a white spot. Longer *filaments* with a small obtuse tooth. *Capsule* $\frac{1}{3}$ in.—I have seen no specimen of Bentham var. β *parviflora* from Ceylon. See *Bonnaya peduncularis* and *veronicæfolia* for remarks.

13. **V. angustifolia,** *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 417; diffuse, glabrous, leaves sessile linear or linear-lanceolate obtuse entire

or obscurely toothed, pedicels axillary solitary equalling or exceeding the leaves, sepals free to the base half as long as the linear-lanceolate capsule. Tittmannia angustifolia, *Benth. in Wall. Cat.* 3951. Torenia calcarata, *Griff. Notul.* iv. 124. ? Lindernia micrantha, *Don Prodr.* 85.

SUBTROPICAL HIMALAYA; Kumaon, *Edgeworth;* Nepal, *Wallich.* BENGAL, ASSAM, the KHASIA MTS., BURMA and PEGU. CEYLON, not common.—DISTRIB. Sumatra, Java, China, Japan.

Stem sometimes shortly prostrate and rooting at the base; branches erect, divaricating, 6–12 in. high, slender or succulent. *Leaves* ¾–1½ in., rather thick, nerves obscure. *Pedicels* variable in length. *Calyx* $\frac{1}{6}$–¼ in., fruiting ⅓ as long as the capsule. Longer *filaments* toothed at the base. *Capsule* linear-lanceolate. See *Bonnaya veronicæfolia* var. *verbenæfolia* for a very near ally of this plant.

25. ILYSANTHES, *Rafin.*

Annual, glabrous, slender marsh-plants. *Leaves* opposite, entire or toothed, parallel-nerved. *Flowers* small, axillary or the upper racemose; pedicels ebracteolate, often reflexed in fruit. *Sepals* narrow. *Corolla-tube* cylindric; upper lip erect, broad, concave, notched; lower larger, spreading, 3-lobed. *Stamens*, 2 upper alone perfect, subincluded, filaments filiform; anthers meeting, cells divaricate; staminodes 2, 2-lobed, one lobe glandular obtuse, the other glabrous of various shapes. *Stigma* 2-lamellate. *Capsule* septicidal; valves entire, separating from the placentiferous septum. *Seeds* numerous, rugose.—Species 8, N. American, S. African, Indian and one S. American.

The staminal characters separating *Ilysanthes* from *Vandellia* are not satisfactory; I should prefer that of the nervation of the leaves, which would remove *Vandellia erecta* (which is hardly recognizable from *I. parviflora*) to this genus.

1. **I. hyssopioides,** *Benth. in DC. Prodr.* x. 419; erect, simple or diffusely branched, leaves in distant pairs sessile oblong or oblong-lanceolate usually entire 1- or 3-nerved upper linear, pedicels axillary filiform, corolla 3–4 times longer than the calyx, fruiting sepals half the length of the ovate-oblong acute capsule. *Dalz. & Gibs. Bomb. Fl.* 179; *Miquel Fl. Ind. Bat.* ii. 695. Gratiola hyssopioides, *Linn. Mant.* 174; *Roxb. Cor. Pl.* iii. 3, t. 203 (*not* ii. t. 128, *nor of Fl. Ind.*). Morgania hyssopioides, *Spreng. Syst.* ii. 803. Bonnaya hyssopioides, *Benth. in Wall. Cat.* 3866 *Wight Ic.* t. 857.

SILHET, *Wallich.* KHASIA MTS.; at Nurtiung, alt. 5000 ft., *J. D. H. & T. T* DECCAN PENINSULA, abundant. CEYLON, common.—DISTRIB. China.

Usually very slender, 4–18 in. high. *Leaves* ¼–1 in., rather thick, obtuse, seldom toothed. *Pedicels* ½–1½ in. *Sepals* narrowly lanceolate. *Corolla* ⅓–½ in. long, pale blue. *Capsule* $\frac{1}{6}$ in.

2. **I. parviflora,** *Benth. in DC. Prodr.* x. 419; erect, simple or diffusely branched, leaves sessile ovate elliptic or linear-oblong usually entire 1–5-nerved, pedicels axillary and in terminal racemes filiform, corolla twice as long as the calyx, fruiting sepals shorter than the ovate-oblong acute capsule. Gratiola parviflora, *Roxb. Cor. Pl.* iii. 3, t. 204, and *Fl. Ind.* i. 140, and *Ed. Carey & Wall.* i. 141. Bonnaya parviflora, *Benth. in Wall. Cat.* 3867, and *Scroph. Ind.* 34.

Throughout INDIA; in wet places, from the Punjab to Assam, Bengal and the Deccan Peninsula (not seen from Ceylon).—DISTRIB. Siam, Trop. Africa.

Very near to *I. hyssopioides*, but a shorter stiffer more branched plant, more p iously flowering, with usually much shorter pedicels, and white or blue flowers not

half the size.—This differs from *Vandellia erecta* in the reduction of the shorter stamens, and in the longer acute capsule.

3. **I. minima,** *Benth. in DC. Prodr.* x. 420; very small and slender, erect, subsimple, leaves few minute ovate- or elliptic-oblong entire, pedicels axillary capillary, corolla three times as long as the calyx, fruiting sepals equalling the subglobose capsule. Bonnaya minima, *Wight Ic.* t. 858, *not of G. Don.*

The DECCAN; at Palamcotta, *Wight.*

Stem 1–3 in., filiform, always simple below. *Leaves* 2–3 pairs, $\frac{1}{10}$–$\frac{1}{4}$ in., obtuse, quite entire. *Flowers* few, large for the size of the plant; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. *Capsule* $\frac{1}{10}$ in. diam.—A very elegant minute plant.

4. **I. rotundifolia,** *Benth. in DC. Prodr.* x. 420; diffuse or creeping, leaves sessile broadly ovate elliptic or rounded entire or toothed 3–5-nerved, pedicels axillary shorter or longer than the leaves, corolla twice as long as the calyx, fruiting sepals equalling the globose capsule. Gratiola rotundifolia, *Linn. Mant.* 174; *Roxb. Cor. Pl.* iii. 3, t. 204, and *Fl. Ind.* i. 137, and *Ed. Wall. & Carey,* i. 138.

COROMANDEL, *Roxburgh.* CANARA, *Hohenacker.* CEYLON, *Macrae,* &c.—DISTRIB. Mauritius and Madagascar.

Stems or branches 6–10 in., often rooting at the nodes. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., obtuse or subacute. *Flowers* few, white; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Corolla* $\frac{1}{3}$ in. long. *Capsule* $\frac{1}{8}$ in.

26. BONNAYA, *Link et Otto.*

Annual, quite glabrous herbs. *Leaves* opposite, entire or serrate, penninerved, nerves very obscure. *Flowers* solitary, axillary, or the upper opposite and racemose, pedicels ebracteolate. *Sepals* 5, narrow. *Corolla-tube* cylindric; upper lip erect, broad, concave, 2-fid; lower larger, spreading, 3-lobed. *Stamens,* 2 lower only perfect, subincluded, filaments filiform; anthers touching, cells divaricate; staminodes 2, entire, glandular, obtuse. *Stigma* 2-lamellate. *Capsule* narrow, far exserted, septicidal; valves entire, separating from the placentiferous septum. *Seeds* numerous, rugose.—Species 8, tropical African and Asiatic.

Several species of this genus so closely resemble others of *Vandellia* as to render its validity very doubtful.

1. **B. brachiata,** *Link & Otto, Ic. Pl. Sel.* i. 25, t. 11; erect, diffusely branched, leaves sessile oblong obtuse or acute sharply closely deeply serrate, flowers racemed shortly pedicelled, corolla $\frac{1}{4}$ in. long, capsules spreading or erect twice as long as the calyx or more. *Benth. in Wall. Cat.* 3855, and in *DC. Prodr.* x. 420; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 695. B. serrata, *Griff. Notul.* iv. 108, and Bonnaya sp. *l. c.* 106. Gratiola serrata, *Roxb. Fl. Ind.* i. 139, and *Ed. Wall. & Carey,* i. 140. B. brachiata & pusilla, *Benth. Scroph. Ind.* 32, 33.—*Rheede Hort. Mal.* ix. t. 59.

Throughout INDIA, from the Punjab to Travancore and Malacca, ascending the Himalaya to 5000 ft. CEYLON, common.—DISTRIB. Java, China, Philippine Islands.

A rather rigid herb, 4–10 in. high; branches divaricate, outer decumbent below. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., margins thickened, teeth mucronate. *Racemes* sometimes 4 in. long, with opposite bracteate flowers; pedicels about equalling the calyx, rigid. *Corolla* red or white. *Capsule* $\frac{1}{2}$ in., slender.

2. **B. reptans,** *Spreng. Syst.* i. 41; prostrate, creeping, leaves

petioled obovate-oblong obtuse sharply serrate, flowers racemed shortly pedicelled, corolla ¾ in. long, capsules spreading twice as long as the calyx or more. *Benth. in DC. Prodr.* x. 420; *Wall. Cat.* 3856; *Dalz. & Gibs. Bomb. Fl.* 179. B. ruelloides & ciliata, *Spreng. l. c.* Gratiola ciliata & ruelloides, *Kœn.; Vahl Enum.* i. 97, 99. G. reptans, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 140. Henckelia Roxburghiana, *Dietr. Sp. Pl.* i. 572.

Eastern India; from NEPAL and SIKKIM (ascending to 7000 ft.) to ASSAM, the KHASIA MTS., CACHAR and TENASSERIM. MADRAS, *Shuter.* SOUTHERN CONCAN (*Dalzell & Gibson*).—DISTRIB. Java, Philippine Islands.

Stems or *branches* often a foot long, with distant pairs of leaves, slender, diffusely branched. *Leaves* ¾–1½ in., narrowed into the petiole, finely serrate. *Corolla* light purple. *Capsule* 1 in. long, very slender.

3. **B. veronicæfolia,** *Spreng. Syst.* i. 41; stem creeping or decumbent; branches ascending, leaves subsessile or narrowed into a short petiole oblong or oblong-lanceolate or obovate serrate or subserrate, flowers racemose, corolla ¼–⅓ in., capsules erecto-patent twice as long as the calyx or more. *Wall. Cat.* 3857; *Benth. in DC. Prodr.* x. 421; *Wight Ic.* t. 1411; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 696. B. marginata, *Spreng. l. c.* B. rigida & procumbens, *Benth. in Wall. Cat.* 3859, 3860. B. Rothii, *Dietr. Sp. Pl.* i. 556. B. bracteata, *Griff. Notul.* iv. 107. Gratiola veronicæfolia, *Retz Obs.* iv. 8; *Roxb. Cor. Pl.* ii. 30, t. 154, and *Fl. Ind.* i. 138, and *Ed. Wall. & Carey*, i. 139. G. marginata, *Colsm. in Vahl Enum.* i. 98. G. racemosa, *Roth Nov. Sp.* 9.

Throughout INDIA; from the Upper Gangetic plain southwards and eastwards to Assam, Travancore and Singapore. CEYLON, common.—DISTRIB. Java, Siam, China, Philippine Islands.

Very variable in habit, but distinguished from *B. brachiata* and *reptans* by the very different serratures of the leaf, which are more distant and less deep. *Corolla* violet (*Roxb.*).

VAR. *grandiflora*; branches short stout, flowers chiefly axillary light blue, capsules smaller hardly twice as long as the calyx. B. grandiflora, *Spreng. Syst.* i. 41; *Benth. in DC. Prodr.* x. 421; *Dalz. & Gibs. Bomb. Fl.* 179; *Miquel Fl. Ind. Bat.* ii. 697. B. pulegiifolia, *Spreng. l. c.* B. Wightii, *Benth. in Wall. Cat.* 3864. Gratiola grandiflora, *Roxb. Cor. Pl.* ii. 42, t. 179, and *Fl. Ind.* i. 136, and *Ed. Carey & Wall.* i. 137. G. pulegiifolia, *Vahl Enum.* i. 98. Henckelia grandiflora, *Dietr. Sp.* i. 573.—I find it impossible to separate this satisfactorily; it inhabits the same area as *B. veronicæfolia* and *Vandellia pedunculata*, which it closely resembles. The name *grandiflora* is not appropriate. *Corolla* light blue (*Roxb.*)

VAR. *verbenæfolia*; branches usually long and slender, leaves narrower subentire or distantly serrate, flowers larger in often elongate naked racemes. B. verbenæfolia, *Benth. in DC. Prodr.* x. 421; *Dalz. & Gibs. Bomb. Fl.* 178; *Wall. Cat.* 3858. *Wight Ic.* t. 1412. B. Roxburghiana, *Dietr. Sp. Pl.* i. 559. B. cyanea, *Griff. Notul.* iv. 107. Gratiola verbenæfolia & ciliata, *Colsm. in Vahl Enum.* i. 96, 97. G. racemosa, *Roxb. Fl. Ind.* i. 138, and *Ed. Wall. & Carey*, i. 139. G. Roxburghiana, *Roem. & Sch. Syst.* i. 123. Tittmannia Colsmanni & Torenia gracilis, *Benth. in Wall. Cat.* 3950, 3952.—This again is with difficulty separated as a variety from *B. veronicæfolia*, and it inhabits the same area. It bears the same relation to it as *Vandellia angustifolia* (which it closely resembles) does to *V. pedunculata.*

4. **B. peduncularis,** *Benth. Scroph. Ind.* 34, and in *DC. Prodr.* x. 421, and in *Wall. Cat.* 3865; stems erect slender simple, leaves sessile linear-oblong obtuse nearly entire, pedicels axillary very long solitary slender much longer than the leaves, capsule nearly three times as long as the calyx.

SILHET, *Wallich.*

This, as Bentham suggests, may be a variety of *B. veronicæfolia* var. *grandifolia*,

growing in moist grassy places; if so, it is a remarkable one, the fruiting calyx being much shorter, not above $\frac{1}{8}$ in. long, and the habit is considerably different. It approaches very closely *Vandellia pedunculata.*

5. **B. oppositifolia,** *Spreng. Syst.* i. 41; very short, erect, diffusely branched, leaves sessile linear-oblong obtuse subserrate, pedicels short often shorter than the calyx axillary or the upper racemed reflexed in fruit, corolla $\frac{1}{4}$ in. long, capsule small twice as long as the calyx or more. *Benth. in DC. Prodr.* x. 421; *Wall. Cat.* 3862; *Dalz. & Gibs. Bomb. Fl.* 179. B. minima, *G. Don Gen. Syst.* iv. 538. Gratiola oppositifolia, *Roxb. Cor. Pl.* ii. 30, t. 155, and *Fl. Ind.*, and *Ed. Wall. & Carey,* i. 139. G. minima, *Roth Nov. Sp.* 8. Henckelia oppositifolia, *Dietr. Sp. Pl.* i. 572.

DECCAN PENINSULA, *Heyne, Wight,* &c.

A much smaller plant than any of the first four species, and with a somewhat different habit, and very small blue flowers; but beyond the general characters indicated above, I am unable to add anything. The flowers are blue (*Roxb.*).

6. **B. tenuifolia,** *Spreng. Syst.* i. 42; succulent, erect, diffusely intricately branched, leaves sessile linear nearly entire, pedicels axillary and the upper racemed deflexed in fruit, corolla $\frac{1}{8}$ in. long, capsule slender two to three times as long as the calyx. *Benth. in DC. Prodr.* x. 422; *Wall. Cat.* 3863; *Miquel Fl. Ind. Bat.* ii. 698. B. pusilla, *Griff. Notul.* iv. 107. Gratiola tenuifolia, *Vahl Enum.* i. 95.

BENGAL; at Serampore, *Griffith.* DECCAN PENINSULA, *Rottler,* &c.; Quilon, *Wight.* TENASSERIM, *Griffith.* CEYLON; at Peradenzia and Caltura, *Macrae.*—DISTRIB. China.

This appears to be a very distinct species, growing in a tufted manner, probably in marshes, with interlaced branches and slender leaves 1–1$\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{6}$ in. The flowers are very small (pale blue, *Griff.*), and the capsules vary from $\frac{1}{4}$–$\frac{1}{2}$ in. in length.

27. BYTHOPHYTON, *Hook. f.*

A slender submerged glabrous herb. *Leaves* opposite, subulate-lanceolate, quite entire. *Flowers* axillary, shortly pedicelled, ebracteolate. *Sepals* 4, subulate-lanceolate. *Corolla* minute, much shorter than the calyx, subcylindric, membranous, obscurely 2-lipped, 4-lobed. *Stamens,* 2 anterior perfect, included, filaments very short sometimes gibbous; anther-cells parallel. *Ovary* ovoid; style short, curved, stigma subcapitate. *Capsule* much shorter than the sepals, broadly oblong, compressed, obtuse, 2-valved, valves 2-fid or 2-partite. *Seeds* many, narrowly oblong, reticulate.

B. indicum, *Hook. f.* Micranthemum indicum, *H. f. & T. in Hook. Journ. Bot.* ix. (1857) 245, t. 7 (*excl. fig. of anthers*).

KHASIA MTS.; marshes at Nonkreem, alt. 4–5000 ft., *J. D. H. & T. T.*

Stems 2–3 in., loosely tufted, flaccid, erect, wholly submerged, terete. *Leaves* $\frac{1}{2}$–$\frac{2}{3}$ in. long, 3-nerved at the base. *Sepals* $\frac{1}{4}$ in. *Corolla* with the lobes closed over the anthers as in submerged states of *Limosella. Stamens* very variable.—A singular little plant, the flowers of which may assume a different character when the marshes dry up. It is clearly the type of a genus, the exact position of which is uncertain. The anthers are erroneously figured as hairy.

28. MICROCARPÆA, *Br.*

A very small slender diffuse or creeping nearly glabrous herb. *Leaves* opposite, sessile, oblong, obtuse, quite entire. *Flowers* minute, axillary,

solitary, sessile, ebracteolate. *Calyx* tubular, 5-angled, 5-fid. *Corolla* very short, tube broad; lobes 5, broad, spreading, 2 upper subconnate. *Stamens*, 2 perfect, filaments filiform; anthers confluent, 1-celled; staminodes 0. *Style* filiform, stigma capitate recurved. *Capsule* included, ovoid, 2-grooved, loculicidal; valves entire, separating from the placentiferous septum. *Seeds* few, ovoid.

M. muscosa, *Br. Prodr.* 436; *Benth. in DC. Prodr.* x. 433; *Miquel Fl. Ind. Bat.* ii. 700. M. alterniflora, *Blume Bijd.* 744; *Benth. l. c.* Pæderota minima, *Koen. in Retz Obs.* v. 10.

LOWER BENGAL, on the Mahanuddy river, *J. D. H. & T. T.* TENASSERIM. MALABAR; at Quilon, *Wight.* CEYLON, not uncommon.—DISTRIB. Java, China, Australia.

Stems tufted and interlaced, 2–4 in. long, rooting at the nodes, angles of stem and calyx sometimes ciliate. *Leaves* $\frac{1}{10}$–$\frac{1}{4}$ in. long. *Flowers* in one axil only of each pair of leaves, about $\frac{1}{16}$ in. long. *Corolla-tube* shorter than the calyx, as is the minute capsule.

DOUBTFUL SPECIES.

M. DIANDRA, *Griff. Notul.* iv. 101, and *Ic. Pl. Asiat.* t. 417, f. 2, according to the description, differs from the generic character of *Microcarpæa* in the 5-partite calyx; as also from *Glossostigma* and *Limosella*, of which it has the habit. I have seen no specimens; it is a native of Bengal, and may be the following genus.

29. PEPLIDIUM, *Delile.*

Very small, prostrate or creeping, glabrous herbs. *Leaves* opposite, fleshy, obovate, quite entire. *Flowers* minute, axillary, 1–3-nate. *Calyx* tubular, 5-ribbed, obtusely 5-toothed. *Corolla-tube* short; lobes 5, broad, subequal. *Stamens* 2, included, filaments arched; anthers 1-celled; staminodes 0. *Ovary* 2-celled; stigma dilated, spathulate, recurved. *Capsule* globose or ovoid, septicidal, or bursting irregularly; valves entire or 2-fid, separating from the placentiferous septum. *Seeds* numerous, small, ovoid.—Species 2, an endemic Australian and the following.

P. humifusum, *Del. Fl. Æg.* 4, t. 4, f. 1; flowers subsessile, capsule globose obtuse. *Benth. in DC. Prodr.* x. 422; *Boiss. Fl. Orient.* iv. 427. Hedyotis maritima, *Linn. f. Suppl.* 119. Oldenlandia maritima, *Roth Nov. Sp.* 97. Pæderota cochlearifolia, *Koen. mss.*; *Wall. Cat.* 3920. Microcarpæa cochlearifolia, *Sm. in Rees' Cyclop.*; *Wight in Hook. Bot. Misc.* iii. 95, *Suppl.* t. 29.

S. DECCAN PENINSULA, *Koenig,* &c.; Pondicherry, *Perottet.* CEYLON; at Trincomalee, *Glenie.*—DISTRIB. Kurdistan, Egypt, Australia.

Stems interlaced, 4–8 in. long, rather stout, forming large tufts. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., usually obovate, sometimes ovate or orbicular, succulent, narrowed into short petioles which are connected by a membrane. *Calyx* about $\frac{1}{16}$ in. long, larger in fruit, membranous with 5 strong ribs. *Corolla-tube* included. *Filaments* thickened and angularly incurved at the base. *Capsule* nearly enclosed in the membranous tubular calyx, membranous, usually bursting irregularly.

30. GLOSSOSTIGMA, *Arn.*

Very small, glabrous, creeping herbs. *Leaves* opposite or fascicled, linear or spathulate, quite entire. *Flowers* minute, axillary, solitary, ebracteolate. *Calyx* campanulate, obtusely 3–4-lobed. *Corolla-tube* short; lobes 5, subequal. *Stamens* 2 or 4, filaments filiform; anther-cells diverging, tips con-

fluent. *Ovary* perfectly or imperfectly 2-celled; style short, stigma dilated spathulate recurved. *Capsule* included in the calyx, loculicidal; valves entire, separating from a columnar axis. *Seeds* small, ovoid.—Species 3, all Australian, one of them widely dispersed.

G. spathulatum, *Arn. in Nov. Act. Nat. Cur.* xviii. 355; leaves narrowly spathulate, calyx 3-lobed, stamens 2. *Benth. in DC. Prodr.* x. 426; *Dalz. & Gibs. Bomb. Fl.* 180; *Miquel Fl. Ind. Bat.* ii. 699. Limosella diandra, *Linn. Mant.* 252 (*the Indian plant*); *Roxb. Fl. Ind.* iii. 91; *Griff. Notul.* iv. 102, t. 458, f. 12. Microcarpæa spathulata, *Benth. Scroph. Ind.* 31; *Wight in Hook. Bot. Misc.* ii. 101, *Suppl.* t. 4. Pæderota minima, *Retz Obs.* v. 10.

UPPER GANGETIC plain, *Royle, Thomson.* BEHAR, *J. D. H.* The DECCAN PENINSULA, common. CEYLON, *Gardner.*—DISTRIB. Tropical Africa and Australia.

A very weak densely tufted creeping rooting herb like *Limosella. Leaves* $\frac{1}{12}$–$\frac{1}{4}$ in. long, tapering into a petiole of variable length. *Pedicels* slender, shorter than the leaves. *Calyx* $\frac{1}{24}$ in. long. *Corolla* blue, tube included. *Capsule* about as long as the calyx.—Griffith's *Microcarpæa diandra* differs from this in the sessile flowers and 5-partite calyx.

31. LIMOSELLA, *Linn.*

Small tufted creeping glabrous marsh- or water-herbs. *Leaves* opposite or fascicled or rarely alternate, long petioled, linear or spathulate, quite entire. *Flowers* minute, axillary, ebracteolate. *Calyx* campanulate, 5-toothed. *Corolla* subrotate or campanulate; lobes 5, subequal. *Stamens* 4, filaments filiform; anthers confluent, 1-celled. *Ovary* 2-celled at the base; style short, stigma incurved capitate. *Capsule* obscurely dehiscent, valves thin. *Seeds* many, small, ovoid, rugulose.—Species 5 or 6, very variable and widely distributed.

L. aquatica, *Linn.*; *Benth. in DC. Prodr.* x. 426; leaves long-petioled narrowly spathulate, corolla-lobes very short. *Benth. in DC. Prodr.* x. 426; *Boiss. Fl. Orient.* iv. 427; *Gaertn. Fruct.* i. 228, t. 50, f. 3; *Reichb. Ic. Fl. Germ.* t. 1722.

WESTERN HIMALAYA; Kashmir, alt. 5–8000 ft., *Thomson,* &c. WESTERN TIBET; alt. 13000–14500 ft., *Thomson.* DISTRIB. N. and S. temperate regions.

Stems creeping. *Leaves* 1–2 in., long petioled. *Peduncles* shorter than the leaves, recurved in fruit. *Corolla* $\frac{1}{10}$ in., pink or white. *Capsule* globose, $\frac{1}{8}$ in. diam.

TRIBE VII. DIGITALEÆ.

32. SIBTHORPIA, *Linn.*

Hairy, creeping herbs. *Leaves* alternate, petioled, reniform or rounded, crenate or pinnatifid. *Flowers* small, axillary, solitary or fascicled, ebracteolate. *Calyx* campanulate, 4–8-fid. *Corolla* subrotate; lobes 4–8, spreading, subequal. *Stamens* as many as the corolla-lobes or one fewer; anthers sagittate, touching. *Stigma* capitate. *Capsule* membranous, compressed, loculicidal, valves septiferous. *Seeds* few, plano- or concavo-convex, rugulose.—Species 6, W. Europe, Africa, the Himalaya and Andes.

S. pinnata, *Benth. in Gen. Pl.* ii. 959; leaves deeply pinnatifid or pinnatisect. Mazus pinnatus, *Wall. Cat.* 3915. Ourisia pinnata, *Benth. Scroph. Ind.* 47. Hornemannia pinnata, *Benth. in DC. Prodr.* x. 428.

NEPAL, *Wallich.*

Hirsute all over with soft spreading hairs. *Stems* very slender, 4–8 in. long, straggling, rooting at the nodes. *Leaves* 1–2 in. long, broadly oblong, or ovate, membranous, segments 5–7 obovate-cuneate broadly adnate, tips crenate or lobulate; petiole 1–3 in. *Pedicels* equalling the petiole or longer or shorter, very slender. *Calyx* $\frac{1}{4}$ in., membranous, lobes ovate acute. *Corolla* $\frac{1}{2}$ in. diam.; lobes spathulate. *Fruit* unknown.

33. **HEMIPHRAGMA,** *Wall.*

A prostrate diffuse pubescent herb. *Leaves* dimorphic; cauline opposite, very shortly petioled, orbicular-cordate or -ovate, or reniform crenate; those on the branches fascicled. acicular, ciliate. *Flowers* axillary, sessile, rosy. *Sepals* 5, narrow. *Corolla-tube* short, slender; lobes 5, rounded, spreading, subequal. *Stamens* 4, on the base of the corolla, equal, filaments short; anthers sagittate, tips of the cells confluent. *Style* short, stigma minute. *Fruit* ovoid, fleshy, shining, at length septicidal, valves entire or 2-fid. *Seeds* numerous, minute, ovoid, smooth.

H. heterophyllum, *Wall. Cat.* 3895, and *Tent. Fl. Nep.* 16, t. 8, and in *Trans. Linn. Soc.* xiii. 612; *Benth. in DC. Prodr.* x. 429.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 6–12,000 ft. KHASIA MTS., alt. 4–6000 ft.

Stems loosely tufted, creeping, 1–2 feet, very slender. *Leaves* on the stem $\frac{1}{3}$–$\frac{2}{3}$ in diam., membranous, hairy on both surfaces; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; those on the branches forming tufts or heads, $\frac{1}{10}$–$\frac{1}{2}$ in. long, rigid, acute, back convex, face deeply channelled. *Flowers* usually sessile in the tufts of the setaceous leaves, rarely of the cauline ones. *Corolla* pink, $\frac{1}{3}$ in. diam. *Fruit* black, polished, $\frac{1}{3}$ in. diam.

34. **SCOPARIA,** *Linn.*

Branched glabrous or pubescent herbs or undershrubs. *Leaves* opposite or whorled, entire or toothed, punctate. *Flowers* small, white yellow or blueish, solitary or 2-nate, axillary, ebracteolate. *Sepals* 4–5, imbricate in bud. *Corolla* rotate, 4-fid, throat densely bearded; lobes obtuse, subequal. *Stamens* 4, subequal, filaments filiform; anthers subsagittate, cells distinct parallel or diverging. *Style* subclavate, stigma notched or truncate; ovules many. *Capsule* globose or ovoid, septicidal; valves entire, membranous, margins inflexed separating from the placentiferous axis. *Seeds* many, obovoid, angled, scrobiculate.—Species 5 or 6, all American.

S. DULCIS, *Linn.*; *Benth. in DC. Prodr.* x. 431; glabrous, leaves lanceolate or elliptic-lanceolate narrowed into a short petiole, sepals 4. *Miquel Fl. Ind. Bat.* ii. 699; *Gaertn. Fruct.* i. 251, t. 53, f. 10; *Beauv. Fl. Ow. & Ben.* t. 115; *Voigt Hort. Sub. Calc.* 507.

PLAINS OF BENGAL; abundant, *Clarke*.—DISTRIB. Tropics of America and sporadically in Africa, Asia and Australia.

A branching annual erect or ascending leafy herb 1–3 ft. high. *Leaves* opposite and 3-nately whorled, variable in width. *Flowers* numerous; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender strict. *Sepals* oblong. *Corolla* $\frac{1}{8}$ in. diam., white. *Capsule* $\frac{1}{8}$ in. diam., globose.—Though now a superabundant Bengal plant according to Mr. Clarke, it was unknown in Roxburgh's time, and occurs in no Indian Herbarium except Clarke's. Voigt mentions it (1845) as found about Serampore, whence probably it has spread quite recently.

35. **CAMPYLANTHUS,** *Roth.*

Shrubs. *Leaves* alternate, linear, fleshy, quite entire. *Flowers* in terminal

racemes, often secund, pedicels 2-bracteolate. *Calyx* 5-fid or -partite. *Corolla-tube* long, slender, incurved; lobes 5, broad, flat, spreading, subequal. *Stamens* 2, included; anther-cells divaricate, tips confluent. *Style* short or long, straight or inflexed, stigma capitate. *Capsule* broad, compressed, septicidal, valves 2-fid. *Seeds* many, orbicular, compressed, notched at the hilum; funicle expanded into a wing that sometimes surrounds the seed.—Species 4, Canaries, Cape de Verds, Arabia, Scinde.

C. ramosissimus, *Wight Ic.* t. 1416; a much branched, rigid, puberulous shrub, leaves linear-oblong or -spathulate, flowers subcorymbose. *Boiss. Fl. Orient.* iv. 433.

SCINDE; limestone hills at Hyderabad, *Stocks.*—DISTRIB. Beluchistan.

A low shrub, branches slender but very stiff, divaricate, spinescent. *Leaves* ¼–½ in. *Flowers* shortly pedicelled. *Sepals* short, lanceolate, acute. *Corolla* ½ in., tube villous within, lobes acute. *Fruit* not seen.

36. PICRORHIZA, *Royle.*

A low more or less hairy herb, with perennial woody bitter stock. *Leaves* subradical, spathulate, serrate. *Flowers* spicate on radical leafy flowering stems, bracteate, ebracteolate, white or blueish, dimorphic (a longer and shorter stamened form). *Sepals* 5, lanceolate, imbricate in bud. *Corolla* of the long stamened form short, membranous, subequally 5-cleft to the middle; lobes ovate, acuminate, ciliate; of the shorter stamened, corolla-tube curved, broad; limb 2-lipped, upper lip longer subgaleate emarginate, lower of 3 shorter ovate acute lobes, the middle one smallest. *Stamens* 4, filaments in the longer stamened very slender, four times as long as the corolla; of the shorter stamened stout, 2 upper shorter than the upper lip of the corolla, with the anthers under the hood, 2 lower exserted; anther-cells subdivergent confluent at the tip. *Ovary* 2-celled, many-ovuled; style of the long stamened long and slender, stigma simple; of the shorter stamened stouter and shorter, stigma capitate exserted. *Capsule* ovoid, turgid, acute, septicidal and loculicidal, margins of the valves inflexed, exposing the columnar placentiferous axis. *Seeds* of an oblong curved nucleus, enclosed in the large bladdery loose hyaline reticulated testa.

I have described this plant as dimorphic with some hesitation, the pistil and stamens being in both forms so fully developed, though in so far as I have seen the anthers of the short stamened have very scanty and irregularly formed pollen, whilst those of the long stamened have copious pollen. Both forms seem to ripen fruit abundantly.

P. Kurrooa, *Benth. Scroph. Ind.* 47, and in *DC. Prodr.* x. 454; *Royle Ill.* 291, t. 71. Valeriana? Lindleyana, *Wall. Cat.* 404 (*corrected to* Veronica, p. 23).

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 9–15,000 ft., common.

Rootstock as thick as the little finger, 6–10 in. long, clothed with withered leaf-bases. *Leaves* 2–4 in., rather coriaceous, tip rounded, base narrowed into a winged sheathing petiole. *Flowering stems* or scapes ascending, stout, longer than the leaves, naked or with a few bracts below the inflorescence. *Spikes* 2–4 in. long, subcylindric, obtuse, many-flowered, subhirsute; bracts oblong or lanceolate, as long as the calyx. *Sepals* ¼ in. long, ciliate. *Corolla* of short stamened form ¼–⅓ in. long, with longer filaments ⅓ in. long, of the longer stamened from ¼ in., with filaments ¾ in. long. *Capsule* ½ in. long.

37. WULFENIA, *Jacq.*

Glabrous herbs, with perennial woody stocks. *Leaves* subradical, petioled,

crenate. *Flowers* bracteate, blue, spicate on radical scapes, secund, ebracteolate. *Sepals* narrow. *Corolla-tube* cylindric; lobes 4, erecto-patent, upper 2-fid, lower entire or crenate. *Stamens* 2, inserted between the upper lobes, exserted; anther-cells divergent, tips confluent. *Stigma* capitate. *Capsule* acute, septi- and loculi-cidal, margins of valves inflexed separating from the placentiferous axis. *Seeds* many, ovoid, concavo-convex; testa lax, smooth. —Species 4, one Carinthian, the others W. Asiatic and Himalayan.

W. Amherstiana, *Benth. Scroph. Ind.* 46, and in *DC. Prodr.* x. 455; nearly glabrous, leaves obovate-oblong or -spathulate coarsely crenate or lobulate base narrowed subpinnatifid, racemes long slender very many-fld., sepals lanceolate or setaceous, corolla-lobes narrow. Pæderota Amherstiana, *Wall. Cat.* 410.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 7–11,000 ft.—DISTRIB. Affghanistan.

Rootstock long, as thick as a goose-quill. *Leaves* 2–5 in., midrib puberulous or subhirsute beneath; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., sometimes hairy. *Scapes* 5–10 in., slender, glabrous or sparsely pubescent, naked or with setaceous deciduous bracts. *Flowers* horizontal; pedicels shorter than the calyx; bracts setaceous, equalling the pedicels or longer. *Calyx* $\frac{1}{6}$ in., glabrous. *Corolla* $\frac{1}{3}$ in., lobes lanceolate, acute. *Style* filiform, far exserted.

38. CALORHABDOS, *Benth.*

Herbs with a perennial stock and tall stems. *Leaves* alternate, serrate. *Flowers* in dense bracteate axillary and terminal spikes, ebracteolate. *Sepals* lanceolate, acuminate. *Corolla-tube* incurved; lobes 4, erecto-patent, entire, 3 lower smaller, one or both lateral exterior in bud. *Stamens* 2, exserted; anther-cells parallel, at length diverging, obtuse, tips confluent. *Style* filiform, stigma slender. *Capsule* acute, septi- and loculi-cidal; valves 4, with inflexed margins, separating from a placentiferous column. *Seeds* numerous, minute, testa appressed.—Species 3, a Chinese, a Japanese and a Himalayan.

C. Brunoniana, *Benth. Scroph. Ind.* 44, and in *DC. Prodr.* x. 456; erect, leaves sessile lanceolate subserrulate, spike terminal elongate very slender and very dense-fld. Valeriana (Veronica, p. 23) Brunoniana, *Wall. Cat.* 405; V.? alternifolia, *Wall. mss.*

NEPAL, *Wallich.*

Stem erect, subsimple, stout, nearly glabrous, 1–2 ft. (or more?) *Leaves* upper alone known, 3–4 by 1–$1\frac{1}{4}$ in., long acuminate, base narrowed. *Spikes* subsessile, 6–10 in., erect, flexuous, glabrous or pubescent; flowers imbricate; bracts small, lanceolate. *Sepals* $\frac{1}{12}$ in. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in., tube rather broad, lobes short. *Capsule* as long as the calyx.

39. VERONICA, *Linn.*

Herbs or shrubs, rarely trees. *Leaves* opposite, rarely scattered or cauline alternate. *Flowers* solitary, axillary, or in terminal or axillary bracteate racemes, ebracteolate, never yellow. *Calyx* 4–5 partite, the lower segments connate, upper if present smaller. *Corolla* rotate, or tube cylindric; lobes 4–5, spreading, lateral, the outer in bud, upper and lower usually narrowest. *Stamens* 2, exserted; anther-cells parallel or not, obtuse, tips confluent. *Stigma* subcapitate; ovules many, rarely 2 in each cell. *Capsule* 2-grooved, compressed or turgid, dehiscence various. *Seeds* few or many, ovate or globose, plano-concave or boat-shaped, smooth or rugulose, sometimes winged.—Species about 160, rare in the tropics and in America.

* Capsule ovoid or oblong, turgid, slightly laterally compressed. Seeds flattened, plano-convex or biconvex.

1. **V. himalensis,** *Don Prodr.* 92; erect, glabrate, leaves sessile ovate acute coarsely irregularly serrate base rounded, racemes terminal and axillary lax-fld., sepals 4 oblong obtuse, corolla very large, capsules ovoid acute. *Benth. in DC. Prodr.* x. 467. V. grandiflora, *Wall. Cat.* 403 (and p. 23).

NEPAL; *Wallich.* SIKKIM; at Yakla, alt. 11,500 ft., *Clarke.*

Perennial? *Stem* 1–2 ft., stout for the genus, simple or nearly so. *Leaves* in distant pairs, 1–2 in., nerves beneath pubescent. *Racemes* erect, 3–5 in.; pedicels about equalling the calyx; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., linear-oblong. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{2}{3}$–1 in. diam., oblong. *Capsule* $\frac{1}{3}$ in. long. *Seeds* minute, irregularly suborbicular, plano-convex, much flattened.

2. **V. deltigera,** *Wall. in Benth. Scroph. Ind.* 45, and *Cat.* 402; stems many from the root erect or ascending pubescent often bifariously, leaves sessile ovate ovate-oblong or oblong-lanceolate serrate, racemes terminal and axillary lax-fld. pubescent, sepals 4 linear-oblong subacute, capsule oblong-ovoid obtuse. *Benth. in DC. Prodr.* x. 475. V. lanosa, *Benth. Scroph. Ind. l. c.*, and in *DC. l. c.* 481. V. rupestris, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 180, t. 25.

WESTERN ALPINE HIMALAYA; from Kashmir to Nepal, alt. 8–12,000 ft.—DISTRIB. Affghanistan.

Perennial *rootstock* short, woody. *Stems* 6–18 in., rigid, slender, subsimple, ascending, leafy. *Leaves* $\frac{3}{4}$–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{3}{4}$ in., very variable in breadth, sometimes inciso-serrate, base rounded or acute. *Racemes* 3–6 in., slender, erect, very many-fld.; lower bracts often leaf-like or lower flowers axillary, upper oblong; pedicels of the lower flowers often $\frac{1}{2}$–$\frac{3}{4}$ in., of the upper shorter. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in. *Corolla* $\frac{3}{4}$ in. diam. or less, lobes broad. *Capsule* $\frac{1}{6}$ in. long, equalling or shorter than the sepals. *Seeds* smaller than in *V. himalensis.*—The description of the fruit in DC. Prodr. is taken from some other plant.

3. **V. ciliata,** *Fisch. mss.*; *Benth. in DC. Prodr.* x. 467; hoary-pubescent all over, stems subsimple erect, leaves sessile ovate or oblong obtuse entire serrate or crenulate, flowers subcapitate, sepals 4 oblong obtuse, corolla small, stamens included, capsule ovoid-oblong obtuse, tip notched. *Ledeb. Fl. Ross.* iii. 240.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Central Asia, Siberia.

Annual. *Stem* 4–12 in., stiff, usually quite simple. *Leaves* $\frac{2}{3}$–$1\frac{1}{2}$ in., very variable in size and toothing, pubescent on both surfaces. *Flowers* sessile in sessile or peduncled terminal hirsute heads; bracts as long as the calyx. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{4}$ in. diam., lobes broad. *Capsule* very variable in size, as long as the calyx or longer. *Seeds* orbicular, compressed, plano-convex.

4. **V. ? macrostemon,** *Bunge in Ledeb. Fl. Alt.* i. 35; hoary-pubescent, stems flexuous diffuse, leaves sessile elliptic or ovate obtuse entire or obscurely crenate, racemes terminal dense-fld. villous, sepals 4 oblong obtuse, stamens long far exserted, anthers large. *Benth. in DC. Prodr.* x. 479.

WESTERN TIBET; Zanskar, alt. 16,000 ft., *Thomson, Lance.*—DISTRIB. Affghanistan, Central Asia.

Perennial. *Rootstock* slender, creeping, with distant scales. *Stems* few, 3–6 in., branched. *Leaves* $\frac{1}{2}$–1 in., pubescent on both surfaces. *Racemes* 1–2 in., flowers crowded, subsessile, or lower axillary and longer pedicelled; bracts oblong obtuse. *Sepals* $\frac{1}{6}$ in., villous. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Capsule* not seen.—Without the fruit it is not possible to identify the Indian plant absolutely with the *V. macrostemon.*

Bentham describes the fruit of the latter as obovate emarginate, but in Kirghis specimens it is oblong and notched at the top.

5. **V. lanuginosa,** *Benth. mss.*; densely woolly, stems very short, leaves sessile imbricate orbicular or upper broadly ovate quite entire, flowers in sessile terminal woolly heads, sepals 4 oblong subacute, corolla-lobes spathulate upper orbicular much larger and broader than the others, capsule elliptic notched.

SIKKIM HIMALAYA; Samdong, alt. 16,000 ft., *J. D. H.*

Stem simple, 2–3 in. high, clothed with imbricating leaves and woolly hairs. *Leaves* $\frac{1}{2}$ in. diam., equally woolly on both surfaces. *Flowers* small amongst the upper bracteal leaves. *Sepals* $\frac{1}{8}$ in. long. *Corolla* $\frac{1}{2}$ in. diam. *Capsule* equalling the sepals, pubescent. *Seeds* few, large, oblong, plano-convex.—A very singular species.

** Capsule somewhat compressed laterally, turgid, orbicular, rarely in *V. Anagallis* broadly ovate. *Seeds* biconvex.

6. **V. Anagallis,** *Linn.*; *Benth. in DC. Prodr.* x. 467; glabrous, rarely pubescent, erect, succulent, leaves sessile or lowest petioled oblong oblong-lanceolate or linear-oblong entire or serrate base usually cordate, racemes long axillary, pedicels spreading. *Reichb. Ic. Fl. Germ.* t. 1762; *Boiss. Fl. Orient.* iv. 437. V. undulata, *Wall. Cat.* 406, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 147. Veronica sp., *Griff. Notul.* iv. 126, and *Ic. Pl. Asiat.* t. 419, f. 2.

N.W. INDIA; from the plains of the Punjab to Western Tibet, and from Kashmir to Bhotan, ascending to 9000 ft. in the Himalaya, and 15,000 in Tibet. BENGAL, the KHASIA MTS. and ASSAM. The DECCAN PENINSULA, in the Concan only.—DISTRIB. Europe, Asia, N. and S. Africa, N. America.

Perennial. *Stem* creeping below, from 6–18 in. high, and from the thickness of a sparrow's quill to that of the middle finger. *Leaves* 2–6 by $\frac{1}{3}$–$\frac{2}{3}$ in. ($1\frac{1}{2}$ in. broad and ovate-cordate in a Kunawur specimen). *Racemes* 3–6 in., slender, lax-fld.; bracts linear-oblong, shorter than the pedicels, which are usually longer than the calyx. *Sepals* $\frac{1}{18}$–$\frac{1}{4}$ in. long, subacute. *Corolla* $\frac{1}{6}$–$\frac{1}{3}$ in. diam., pink or purplish. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., broadly ovate in some Tibetan specimens. *Seeds* ovoid or oblong, biconvex.

VAR. *oxycarpa*; capsules subacute longer than the sepals. V. oxycarpa, *Boiss. Fl. Orient.* iv. 438.—Kunawur, alt. 9000 ft., *Thomson.* Persia, Affghanistan.

VAR. *punctata*; dwarf, leaves all petioled ovate serrate or the upper only linear-oblong sessile amplexicaul. V. punctata, *Ham. in Don Prodr.* 93; *Benth. in DC. Prodr.* x. 468, *in part.*—Nepal, *Hamilton*; Bengal at Beauleah and Malda, *Clarke.* Benares, *Wall.* I think there is no doubt of this being a form of *V. Anagallis*, Assam specimens of which and others have similar lower leaves. The Cabul *punctata* of Bentham is, as Boissier has pointed out, nothing but *V. Anagallis*; and his var. β *extensa* is a luxuriant state of the same with larger bracts, sepals, &c.

VAR. *montioides,* Boiss. Fl. Orient. iv. 437; dwarf, slender, stems often simple, leaves ovate or oblong, racemes few few-fld. V. pusilla, *Benth. in DC. Prodr.* x. 468.—Western Tibet, *Thomson.* Affghanistan. The Herbarium specimens seem to be partly dwarf forms and partly seedlings of *V. Anagallis.*

7. **V. Beccabunga,** *Linn.*; *Benth in DC. Prodr.* x. 468; glabrous or puberulous, decumbent, succulent, leaves sessile or shortly petioled elliptic or oblong obtuse crenate-serrate base rounded, racemes axillary few- or many-flowered, pedicels spreading. *Reichb. Ic. Fl. Germ.* t. 1701; *Boiss. Fl. Orient.* iv. 438.

WESTERN HIMALAYA; from Kashmir and Rawul Pindee, *Aitchison,* to Kunawur, *Thomson.* WESTERN TIBET, alt. 9–12,000 ft., *Thomson.*—DISTRIB. Affghanistan to Europe, N. Africa (Abyssinia), N. Asia to Japan.

Stem hollow, branches 6–18 in., spreading. *Leaves* 1–2 in., rarely obovate. *Racemes* 2–4 in.; bracts usually shorter than the pedicels. *Sepals* ovate-oblong, subacute. *Corolla* $\frac{1}{3}$ in. diam., blue or pink. *Capsule* and *Seeds* as in *V. Anagallis.*

*** Capsule didymous, lobes globose or flattened, 1–∞-seeded. Seeds cup-shaped, or deeply grooved on one side.

8. **V. hederæfolia,** *Linn.*; *Benth. in DC. Prodr.* x. 490; prostrate, hairy, leaves petioled orbicular-ovate 5–7-lobed, pedicels axillary solitary fruiting decurved, sepals cordate ciliate exceeding the corolla, capsule biglobose, cells 1–2-seeded. *Boiss. Fl. Orient.* iv. 468; *Fl. Dan.* iii. t. 428.

KASHMIR; alt. 6000 ft., *Thomson.*—DISTRIB. China, Japan, Persia to Syria, N. Africa and all Europe.

Annual. *Branches* numerous, 6–18 in. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in. diam., petiole short dilated upwards, lobes rounded. *Flowers* appearing in succession as the branch elongates, pedicels about equalling the leaves. *Sepals* membranous, acuminate. *Corolla* $\frac{1}{6}$ in. diam., pale blue. *Seeds* large, rugose, subglobose, with a deep pit on the inner face, black.

9. **V. agrestis,** *Linn.*; *Benth. in DC. Prodr.* x. 487; prostrate, puberulous, leaves petioled ovate cordate or orbicular coarsely crenate-serrate, pedicels axillary solitary as long as the leaves fruiting decurved, sepals ovate, capsule biglobose turgid, cells 4–10-seeded. *Reichb. Pl. Crit.* t. 277; *Boiss. Fl. Orient.* iv. 466. V. polita, *Fries*; *Reichb. Pl. Crit.* t. 246.

Plains of the PUNJAB, and UPPER GANGETIC VALLEY, and WESTERN HIMALAYA, from Kashmir to Kumaon, ascending to 6000 ft. WESTERN TIBET, Iskardo, alt. 9000 ft. —DISTRIB. Europe, N. E. and W. Asia to Japan, China and Loochoo Islands, N. Africa.

Annual. *Branches* numerous, 6–18 in. *Leaves* $\frac{1}{3}$–1 in. diam.; petiole rarely $\frac{1}{3}$ in. *Sepals* $\frac{1}{4}$ in., obtuse, ciliate, fruiting sometimes $\frac{1}{3}$ in. *Corolla* $\frac{1}{6}$–$\frac{1}{3}$ in., shorter or longer than the sepals, white or blue. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* oblong or orbicular, cup-shaped, tubercled, pale.—The two forms, *agrestis* proper, with larger leaves, narrower sepals, pale blue or white corolla, and 8–10-seeded capsules, and the subsp. *polita*, with smaller leaves, broader sepals, bright blue corolla, and 16–20-seeded capsule, are probably both Indian.

10. **V. persica,** *Poir. Dict.* viii. 542; prostrate, hairy, leaves shortly petioled oblong or ovate coarsely crenate-serrate base rounded or cordate, pedicels axillary solitary much longer than the leaves, sepals ovate or lanceolate fruiting spreading, capsule much broader than long flattened. V. Buxbaumii, *Tenore, Fl. Neap.* i. 7, t. 1; *Reichb. Pl. Crit.* t. 268; *Benth. in DC. Prodr.* x. 487; *Boiss. Fl. Orient.* iv. 465.

WESTERN HIMALAYA; Kashmir, alt. 6000 ft., *Falconer*, &c. Garwhal, at Mussooree, alt. 7000 ft., *Edgeworth.*—DISTRIB. Europe, W. and Central Asia, N. Africa.

Annual. *Branches* 6–12 in., tips often ascending. *Leaves* $\frac{1}{3}$–1$\frac{1}{3}$ in., obtuse; petiole very variable. *Pedicels* slender, fruiting decurved. *Sepals* $\frac{1}{4}$ in., fruiting much longer than the capsule. *Corolla* $\frac{1}{2}$ in. diam., bright blue. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., very much broader than long; valves strongly reticulated, cells 5–12-seeded. *Seeds* boat-shaped, deeply pitted.

11. **V. biloba,** *Linn.*; *Benth. in DC. Prodr.* x. 485; erect or ascending, diffusely branched, puberulous or glabrate, leaves sessile or shortly petioled oblong or ovate-lanceolate acute subserrate, floral oblong-lanceolate quite entire, pedicels axillary longer than the leaves, fruiting spreading or decurved, sepals connate in pairs at the base, ovate acute or acuminate, capsule much broader than long flattened. *Boiss. Fl. Orient.* iv. 464. V. campylopoda,

Boiss. Diagn. i. iv. 80, and *Fl. Orient. l. c.*; *Reichb. Ic. Fl. Germ.* vii t. 645.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–10,000 ft. WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Westward to Asia Minor, Soongaria.

Annual. *Branches* slender, 4–18 in., sparsely leafy, running into very loose racemes. *Leaves* $\frac{1}{4}$–1 in., very variable in breadth, teeth few and remote. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{6}$ in., fruiting $\frac{1}{4}$–$\frac{1}{3}$ in., spreading. *Corolla* blue, shorter than the calyx. *Capsule* $\frac{1}{8}$–$\frac{1}{4}$ in. diam., much smaller than the calyx, cells 2–4-seeded. *Seeds* oblong, boat-shaped, more or less deeply pitted.—*V. campylopoda* is only a small state with smaller flowers; I cannot distinguish it as a variety even. The seeds of *V. biloba* vary much in depth of pitting. *V. microtheca*, Boiss. & Bal Diagn. Ser. 2, vi. 131, *V. bartsiæfolia*, and *V. elbrusensis*, Boiss. Herb., *V. Griffithii*, Benth. in DC. l. c. 485, *V. argute-serrata*, Regel & Schmalk., and V. *cardiocarpa*, Walp. (*Diplophyllum cardiocarpum*, Kar. and Kir.), all appear to me to be forms of *V. biloba*.

**** Capsule laterally flattened, broadly obcordate, keeled.

† *Seeds elliptic, much flattened, biconvex or plano-convex.*

12. **V. laxa,** *Benth. Scroph. Ind.* 45, and in *DC. Prodr.* x. 474; glabrous or sparsely pubescent, stems long ascending, leaves sessile ovate or cordate obtuse or subacute coarsely crenate-serrate, racemes axillary peduncled slender, capsule broadly obcordate ciliate. V. Thunbergii, *A. Gray, Bot. Japan.* 402.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–11,000 ft., *Royle*, &c.—DISTRIB. Japan.

Root perennial. *Stems* 10–20 in., rather stout, simple, hairy all over or glabrate. *Leaves* 1–2 in., pubescent on both surfaces. *Racemes* 3-10 in., lax-fld.; bracts linear-oblong, longer or shorter than the pedicels; pedicels shorter than the calyx. *Sepals* unequal, enlarged in fruit. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Capsule* $\frac{1}{8}$ in. diam., equalling or shorter than the sepals.

13. **V. cana,** *Wall. Cat.* 401; *Benth. Scroph. Ind.* 45, and in *DC. Prodr.* x. 475; pubescent villous or glabrate, stems elongate ascending, leaves petioled ovate or ovate-cordate obtuse crenate-serrate, racemes axillary and terminal peduncled slender, capsule broadly deltoid top 2-lobed. V. scrophularioides, *Wall. mss.*

TEMPERATE HIMALAYA; from Chumba to Sikkim, alt. 9–13,000 ft.—DISTRIB. Japan, Formosa.

Root perennial. *Stems* 6–12 in., simple, usually slender, pubescent all round, or bifariously, or glabrate. *Leaves* in very few and distant pairs, 1–1$\frac{1}{2}$ in., pubescent on both surfaces or glabrate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Racemes* 2–3 in., lax-fld.; bracts small, linear, shorter than the calyx; pedicels equalling or shorter than the calyx. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., unequal, linear-oblong. *Corolla* $\frac{1}{2}$ in. diam., blue. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., glabrous or ciliate.—The Sikkim specimens are much more glabrous than the Western, and small specimens have the bifariously pubescent stems.

14. **V. capitata,** *Benth. Scroph. Ind.* 45, and in *DC. Prodr.* x. 481; pubescent, stems short suberect simple, leaves sessile or shortly petioled rounded ovate or shortly oblong obtuse crenate-serrate or subentire, base rounded, flowers in terminal sessile villous umbels or heads, capsule broadly obcordate.

ALPINE HIMALAYA; from Kunawur to Bhotan, alt. 10–14,000 ft.

Annual or roots perennial, 3–6 in. high. *Leaves* $\frac{1}{4}$–1 in., usually pubescent on both surfaces, uppermost pair often the largest. *Flowers* sessile in the uppermost pairs of

leaves, forming a head $\frac{1}{4}$–$\frac{3}{4}$ in. diam.; pedicels 0–$\frac{1}{6}$ in. *Sepals* $\frac{1}{6}$ in. long, spathulate-oblong, obtuse. *Corolla* $\frac{1}{4}$ in. diam., blue. *Capsule* $\frac{1}{6}$ in. diam., ciliate.

7865 VAR.? *sikkimensis*; stem decumbent branched, leaves longer petioled often 2 in. long.—Sikkim; Lachen, alt. 12,000 ft., *J. D. H.* This looks like a very luxuriant form of *V. capitata* with stems 8–10 in., large membranous leaves and petioles sometimes $\frac{1}{2}$ in. long.

15. **V. javanica,** *Blume Bijd.* 742; pubescent, diffusely repeatedly branched, leaves shortly petioled ovate obtuse crenate-serrate base rounded subcordate or truncate, flowers small in short few-fld. axillary and terminal racemes, capsule very small broadly obcordate or didymous shorter than the calyx. *Miquel Fl. Ind. Bat.* ii. 701; *Benth. in DC. Prodr.* x. 489. V. Maddeni, *Edgew. mss.*

SUBTROPICAL and TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 3–7000 ft. KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*—DISTRIB. Java, Loochoo Islands.

Annual. *Stems* very numerous, spreading from the root, ascending, 6–18 in., stout or slender, intricately branched. *Leaves* $\frac{3}{4}$–1 in., more or less pubescent on both surfaces; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Racemes* subsessile, $\frac{1}{2}$–1 in., fruiting 1–2 in.; pedicels $\frac{1}{16}$ in., shorter than the small narrow bracts. *Sepals* linear-oblong, obtuse, $\frac{1}{10}$ in. long. *Corolla* $\frac{1}{4}$ in. diam. *Capsule* $\frac{1}{8}$ in. diam., pubescent.

16. **V. verna,** *Linn.*; *Benth. in DC. Prodr.* x. 483; puberulous, glandular upwards, stems short erect simple densely leafy and flowering for most of their length, leaves sessile oblong simple or 3-cleft or pinnatisect, flowers axillary shortly pedicelled, capsule broadly obcordate. *Reichb. Ic. Fl. Germ.* t. 1720, f. 1; *Boiss. Fl. Orient.* iv. 456.

WESTERN HIMALAYA; Kashmir and Jamu, alt. 5–7000 ft., *Thomson.*—DISTRIB. Europe, N. Asia.

Annual. *Stem* 2–6 in., slender, erect, simple or branched from the base, together with the flowers and leaves forming a cylindric stout spike. Leaves $\frac{1}{8}$–$\frac{1}{2}$ in., imbricate, or the lower distant. *Flowers* small, blue, pedicels very short. *Sepals* linear-lanceolate. *Corolla* pale blue, shorter than the calyx. *Capsule* $\frac{1}{8}$ in. diam., glandular, about as long as the sepals.

17. **V. arvensis,** *Linn.*; *Benth. in DC. Prodr.* v. 483; pubescent, stems simple or diffusely branched, branches ending in long bracteate racemes, leaves very small subsessile ovate-cordate crenate, floral alternate oblong or lanceolate quite entire, racemes dense- or lax-fld., pedicels much shorter than the floral leaves, corolla minute, capsule broadly obcordate glandular-hairy shorter than the calyx. *Reichb. Ic. Fl. Germ.* t. 1720, f. 2; *Boiss. Fl. Orient.* iv. 457.

WESTERN HIMALAYA; from Kashmir and Kishtwar, alt. 7–9000 ft., *Thomson,* to Garwhal, *Edgeworth.*—DISTRIB. Europe, N. Asia, and N. Africa.

Annual, 6–10 in. high; branches bifariously pubescent, often continuously leafy and floriferous throughout. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., mostly sessile; floral alternate, linear-oblong or lanceolate, crowded or scattered. *Pedicels* very short. *Sepals* narrow, obtuse, ciliate. *Corolla* pale blue. *Capsule* $\frac{1}{8}$–$\frac{1}{3}$ in. broad.

18. **V. serpyllifolia,** *Linn.*; *Benth. in DC. Prodr.* x. 482; glabrous or glandular-pubescent, creeping below, branched from the base, branches ending in long bracteate racemes, leaves sessile rounded or oblong subentire, floral alternate oblong quite entire, racemes dense- or lax-fld., pedicels equalling the floral leaves, capsule broadly obcordate, shorter than the calyx glabrous. *Reichb. Ic. Fl. Germ.* t. 1718; *Boiss. Fl. Orient.* iv. 453.

TEMPERATE and SUBALPINE WESTERN HIMALAYA; from Chumba to Kumaon, alt. 8–13,000 ft.—DISTRIB. Europe, N. Asia, N. Africa, N. and S. America.

Perennial. *Branches* 3–10 in., ascending. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., rather coriaceous. *Racemes* 1–4 in.; lower bracts leaf-like, upper narrow. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., obovate-oblong, ciliate, shorter than the corolla. *Corolla* $\frac{1}{4}$ in. diam., white or lilac.

TRIBE VIII. **GERARDIEÆ.**

40. **ALECTRA,** *Thunb.*

Erect, rigid, usually scabrid herbs, black when dry. *Leaves* opposite or the upper (rarely all) alternate, toothed (reduced to scales in *A. Thomsoni*). *Flowers* in terminal spikes or racemes, solitary in the axils of bracts, 2-bracteolate, upper crowded, yellow, or streaked with red or brown. *Calyx* campanulate, subfoliaceous, 5-toothed or -fid, lobes valvate or open in bud. *Corolla-tube* broad; limb oblique; lobes 5, spreading, the lower outer in bud. *Stamens* 4, didynamous; anthers touching in pairs, naked or bearded, cells parallel, bases mucronate. *Style* long, inflexed, stigma elongate tongue-shaped. *Capsule* subglobose, loculicidal, valves entire or 2-fid. *Seeds* very numerous, minute, linear, testa very lax reticulate, nucleus small.—Species 14, tropical American, African and Indian.

1. **A. indica,** *Benth. in DC. Prodr.* x. 339; scaberulous, leaves sessile or shortly petioled ovate-lanceolate or lanceolate coarsely toothed base cuneate rarely cordate, bracts longer than the sessile flowers. A. cordata, *Benth. in DC. l. c. (the Himalayan specimen).* Hymenospermum dentatum, *Benth. in Wall. Cat.* 3963. Glossostyles arvensis, *Benth. Scroph. Ind.* 49.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 3–9000 ft. KHASIA MTS., alt. 4–6000 ft. BEHAR; top of Parusnath, *Anderson*, &c. AVA, *Wallich.*—DISTRIB. Mauritius.

Stem 6–18 in., naked below, simple, or branched above. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., sparingly coarsely toothed. *Spikes* pubescent, 3–6 in.; flowers crowded; bracteoles ciliate. *Calyx* $\frac{1}{8}$ in. long. *Corolla* $\frac{1}{4}$ in. long, yellow, lobes rounded subequal. *Filaments* ciliate; anthers yellow. *Capsule* shorter than the calyx, subglobose, 4-lobed. *Seeds* linear, nucleus very small in the centre of the transparent sausage-shaped testa.

2. **A.? Thomsoni,** *Hook. f.*; slender, leaves scale-like, flowers racemose, bracts minute.

BEHAR; on Parusnath, alt. 3000 ft., parasitic on a *Strobilanthes, Thomson.*

A very singular plant, resembling the S. African *A. orobanchoides*, Benth. *Stem* rigid but flexuous, 6–15 in. high, simple or branched at the rootstock, hardly scaberulous. *Leaves* represented by a few scattered scales $\frac{1}{10}$–$\frac{1}{4}$ in. long, the largest oblong, obtuse. *Racemes* 6–10 in., lax-fld.; bracts minute; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in., slender. *Calyx*, fruiting hemispheric, $\frac{1}{4}$ in. diam.; lobes broadly triangular. *Capsule* globose, as long as the calyx. *Seeds* as in *A. indica*, but more minute and elongate-cuneiform.

41. **BUCHNERA,** *Linn.*

Rigid annual herbs, black when dry. *Leaves*, lower opposite, broad; upper alternate, narrow. *Flowers* sessile, axillary, or in bracteate spikes, 2-bracteolate. *Calyx* tubular, 10-nerved, sometimes 5-ribbed, 5-toothed. *Corolla-tube* slender; lobes 5, flat, subequal, spreading, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse, connective sometimes mucronate. *Style* thickened or clavate above, stigma entire or notched. *Capsule* oblong, loculicidal; valves coriaceous, entire, septiferous, separating from the placentas. *Seeds*

very numerous, obovoid or oblong, reticulated.—Species about 30, widely dispersed in warm countries.

1. **B. tetrasticha,** *Benth. Scroph. Ind.* 41, and in *DC. Prodr.* x. 495; stout, scabrid, root-leaves evanescent, leaves sessile linear-oblong obtuse quite entire, spikes 4-angled stout villous, bracts broadly ovate equalling the calyx. *Wall. Cat.* 3878.

UPPER ASSAM; Mishmi Hills, *Griffith.* TENASSERIM; at Moulmein, *Wallich, Griffith, Helfer.*

Stem simple, 12–24 in., leafy. *Leaves* 1–2½ in., rigid. *Spikes* solitary or several, amentiform, dense-fld., 1–2 by ½–1 in., bracts horizontal. *Calyx* depressed. *Corolla-tube* slender, twice as long as the calyx.

2. **B. cruciata,** *Ham. in Don Prodr.* 91; slender, nearly smooth, root-leaves spreading oblong obtuse, cauline linear entire or toothed, spikes 4-angled pubescent, bracts ovate ciliate equalling or shorter than the calyx. *Benth. in DC. Prodr.* x. 495; *Wall. Cat.* 3879; *Miquel Fl. Ind. Bat.* ii. 702. B. sumatrana, *Miquel l. c.* B. stricta, *Benth. in Hook. Comp. Bot. Mag.* i. 367, and in *DC. Prodr. l. c.* B. densiflora, *Hook. & Arn. Bot. Beech. Voy.* 203.

NEPAL, *Wallich.* KHASIA MTS., alt. 3–5000 ft., *Griffith,* &c. BURMA, *Wallich.* —DISTRIB. Sumatra, Java, China.

Stem 10–18 in., simple or branched upwards. *Leaves,* radical rosulate, 1–1½ in., pubescent, base narrowed; cauline erect, 1–2 in., teeth few and irregular. *Spikes* ½–1 in. by ¼–½ in. *Calyx* longer than in *B. tetrasticha,* half as long as the corolla. *Capsule* longer than the calyx.

3. **B. hispida,** *Ham. in Don Prodr.* 91; slender, hispid, root-leaves obovate or oblong, cauline linear-oblong or -lanceolate toothed or entire obtuse, spike slender, flowers distant, bracts narrow. *Benth. in DC. Prodr.* x. 496; *Wall. Cat.* 3875; *Wight Ic.* t. 1413; *Dalz. & Gibs. Bomb. Fl.* 182. B. Schimperiana, *Hochst. Pl. Abyss. Exsicc.* n. 23.

WESTERN and CENTRAL HIMALAYA; from Kashmir to E. Nepal, alt. 1–9000 ft. BEHAR, on Parusnath, *J. D. H.* CENTRAL INDIA, at Hazarabagh, *Clarke.* DECCAN PENINSULA, from the Concan southwards.—DISTRIB. Madagascar, Tropical Africa.

Stem 6–18 in., often branched above. *Root-leaves* 1–2 in., cauline usually longer and narrower. *Spikes* 6–10 in., very slender; flowers often distant. *Calyx* hispid, ⅙ in. long, lobes very narrow. *Corolla-tube* not twice as long as the calyx, limb ¼ in. diam. *Capsule* shorter than the calyx.—Wight states that his specimens from Coorg are not hairy, as described in the character of the plant; these I have not found in his Herbarium.

42. **Striga,** *Lour.*

Usually scabrid herbs, discoloured or black when dry. *Leaves,* lower opposite, upper alternate, linear, entire, rarely toothed, sometimes reduced to scales. *Flowers* axillary or the upper in bracteate spikes, often 2-bracteolate. *Calyx* tubular, strongly 5–15-ribbed, 5-toothed or -fid. *Corolla-tube* slender, abruptly incurved at or about the middle or top; limb spreading, 2-lipped, upper lip usually short notched or 2-fid; lower the inner in bud, 3-fid. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse, connective sometimes mucronate. *Style* thickened above, stigma simple. *Capsule* subglobose or oblong, loculicidal; valves entire, septiferous, separating from the placentas. *Seeds* very numerous, ovoid or oblong, reticulated.—Species about 18, in the hotter regions of the Old World.

* *Calyx* 5-*ribbed.*

1. **S. orobanchoides,** *Benth. in Hook. Comp. Bot. Mag.* i. 361, t. 19, and in *DC. Prodr.* x. 501; glabrous or pubescent, leaves scale-like, bracts lanceolate hardly as long as the calyx, corolla-tube incurved. *Dalz. & Gibs. Bomb. Fl.* 181; *Wight Ic.* t. 1414. Buchnera orobanchoides, *Br. in App. Salt. Abyss., ex Endl. in Flora* 1832, 387, t. 2. B. hyderabadensis, *Roth Nov. Sp.* 292; *Wall. Cat.* 3871. Orobanche indica, *Spreng. Syst.* ii. 817, *not of Roxb.* Striga orchidea, *Hochst. Pl. Nub. Exsicc.* n. 387.

WESTERN INDIA; Scinde, and Marwar, on Mt. Aboo, *Stocks.* The Deccan from the Concan southwards. Suhunsudhara, *Royle.*—DISTRIB. Tropical and S. Africa, Arabia.

Rootstock tuberous; stems 6–10 in., stout or slender, simple or branched, glabrous or pubescent; branches stout, erect. *Leaves* opposite and alternate. *Spikes* variable in length, dense or lax-fld. *Calyx-lobes* acuminate. *Corolla* small, 2-lipped, described as white, rosy, blue or red-brown; tube exserted; limb ¼ in. diam. *Capsule* subglobose.

2. **S. densiflora,** *Benth. in Hook. Comp. Bot. Mag.* i. 363, and in *DC. Prodr.* x. 502; scabrid or strigose, leaves linear, bracts lanceolate longer than the calyx, corolla-tube incurved. *Dalz. & Gibs. Bomb. Fl.* 181. Buchnera densiflora, *Benth. Scroph. Ind.* 41; *Dalz. & Gibs. Bomb. Fl.* 181. B. asiatica, L. ?, *Wall. Cat.* 3873 C.

UPPER GANGETIC PLAIN; Saharumpore, *Royle*; Benares, *Madden.* DECCAN PENINSULA, from Guzerat southwards.

Stem 6–18 in., simple or branched; branches erect, stout or slender, sometimes fastigiate. *Leaves* ½–1 by $\frac{1}{16}$–$\frac{1}{8}$ in., erect. *Spikes* usually slender, sometimes very long with distant flowers; bracts linear. *Calyx* ⅛ in., lengthening in fruit, lobes subulate. *Corolla* white, tube exserted, limb ¼ in. diam. *Capsule* included in the calyx.

** *Calyx* 10–15-*ribbed.*

3. **S. lutea,** *Lour. Fl. Cochin.* 22; scabrid or villous, leaves linear, calyx 10-ribbed. *Benth. in Hook. Comp. Bot. Mag.* i. 363. S. hirsuta, *Benth. in DC. Prodr.* x. 502; *Dalz. & Gibs. Bomb. Fl.* 181. S. coccinea, and S. phœnicea, *Benth. in Hook. l. c.* 364. S. pusilla, *Hochst. Plant. Schimp.* Buchnera asiatica, *Linn. Sp. Pl. in part*; *Roxb. Fl. Ind.* iii. 31; *Benth. Scroph. Ind.* 40. B. coccinea, *Benth. Scroph. Ind.* 40; *Wall. Cat.* 3870. B. phœnicea, *Benth. Scroph. Ind.* 40; *Wall. Cat.* 3874. Campuleia coccinea, *Hook. Fl. Exot.* t. 203.—*Rheede Hort. Mal.* ix. t. 66.

Throughout WESTERN INDIA and the DECCAN; from Scinde and the Punjab southwards (Kumaon only, in the HIMALAYA, ascending to 6000 ft.) BENGAL. TENASSERIM.—DISTRIB. Siam, Java, China, Arabia, Tropical and S. Africa, Madagascar.

Stem usually slender, 6–18 in., simple or fastigiately branched. *Leaves* ½–1½ in. *Spikes* elongate; flowers usually distant; bracts usually longer than the calyx. *Calyx* rarely 15-ribbed. *Corolla* very variable in size, scarlet, purple, yellow or white; tube twice as long as the calyx, glabrous or nearly so, inflexed at the top. The var. *humilis,* Benth. in DC. l. c., has rather broader leaves and a dense spike.

4. **S. euphrasioides,** *Benth. in Comp. Bot. Mag.* i. 364; and in *DC. Prodr.* x. 503; scabrid or strigose, leaves linear, calyx ¼ in. 15-ribbed, lobes as long as the tube, corolla ½–¾ in. long. *Dalz. & Gibs. Bomb. Fl.* 181; *Miquel Fl. Ind. Bat.* ii. 705. S. glabrata, *Benth. in Hook. l. c.* Buchnera euphrasioides, *Vahl Symb.* iii. 81; *Roxb. Fl. Ind.* iii. 32; *Wight Ic.* t. 855. B. angustifolia, *Don Prodr.* 91. B. bifida, *Ham. in Wall. Cat.* 3872. B. asiatica, *Linn. Herb. in part.*

Throughout INDIA, in the plains from the Punjab southwards to CEYLON, and eastwards to the Khasia Mts., Pegu and Burma; ascending the Himalaya to 4000 ft. (not seen from the Eastern Peninsula or lower Bengal).—DISTRIB. Java (*Miquel*).

Very variable in habit, from a simple filiform stem 4–6 in., to a stout branched herb 2 ft. *Leaves* $\frac{1}{4}$–2 in., often 1–2-toothed. *Spikes* interrupted; flowers often distant. *Corolla* white, tube pubescent at the curve. *Calyx* bell- or funnel-shaped in fruit.

5. **S. Masuria,** *Benth. in Hook. Comp. Bot. Mag.* i. 364, and in *DC. Prodr.* x. 503; scabrid, leaves linear, calyx $\frac{1}{2}$ in. narrow 15-ribbed, lobes equalling the tube, corolla-tube 1 in. limb $\frac{3}{4}$–1 in. diam. Buchnera Masuria, *Ham. in Benth. Scroph. Ind.* 41. B. Wallichii, *Benth. in Wall. Cat.* 3876.

NEPAL; in the Morung, *Hamilton*. MADRAS; at Guindy, *Shuter*. BURMA; at Prome, *Wallich*.—DISTRIB. China, Philippine Islands.

Stem very slender, 1–2 ft. *Leaves* 1–2 in. *Flowers* distant. *Fruiting calyx* $\frac{5}{8}$–1 in., tube ventricose, ribs very strong and close.

6. **S. sulphurea,** *Dalz. & Gibs. Bomb. Fl.* 182; very slender, scabrid, leaves linear, flowers mostly axillary, calyx $\frac{1}{2}$–$\frac{5}{8}$ in., lobes filiform equalling the tube, corolla-tube not exceeding the calyx, limb very small.

The CONCAN; at Seconere hill-fort, *Dalzell*.

Stem 6–12 in. *Leaves* 1–1$\frac{1}{2}$ in., extremely slender. *Flowers* few, distant, all axillary or the upper subspicate, shorter than the floral leaves. *Calyx* very narrow, fruiting $\frac{5}{8}$ in., tube ventricose, ribs very strong. *Corolla* yellow, limb $\frac{1}{6}$ in. diam.

43. **Rhamphicarpa,** *Benth.*

Erect glabrous herbs. *Leaves,* lower opposite, upper alternate, narrow, entire or pinnatisect. *Flowers* axillary and pedicelled, or in bracteate racemes; bracteoles 1–2 or 0. *Calyx* campanulate, 5-fid, lobes acuminate. *Corolla-tube* slender, long, straight or incurved; lobes 5, broad, spreading, subequal or the upper connate. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse. *Style* thickened above, stigma simple. *Capsule* compressed at right angles to the septum, usually beaked, loculicidal; valves septiferous. *Seeds* numerous, small, obovoid or oblong, tube reticulate.—Species 6, tropical and S. African, Indian and Australian.

R. longiflora, *Benth. in Hook. Comp. Bot. Mag.* i. 368, and in *DC. Prodr.* x. 504; annual, leaves pinnatisect segments filiform, corolla-tube very long straight, capsule with a slender curved beak. *Dalz. & Gibs. Bomb. Fl.* 182; *Wight Ic.* t. 1415. Buchnera longiflora, *Arn. Pugill.* 38.

DECCAN PENINSULA, from the Concan southwards.

Very variable in habit and stature, from 2 in. slender and simple, to 10 in. diffusely branched. *Leaves* 1–1$\frac{1}{2}$ in.; segments few, $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* shortly pedicelled. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., tube short, lobes lanceolate 3 times as long as the tube. *Corolla* dull white, tube 1–1$\frac{1}{2}$ in., limb $\frac{5}{8}$ in. diam. *Capsule* $\frac{1}{2}$ in., ovoid, ventricose, beak longer or rather shorter than the cells.—Bentham (Fl. Austral. iv. 518) unites with this the African *R. fistulosa*, Benth., and an Australian species, but the calyx is much longer in *R. longiflora*, and I think the three are distinct, though very near.

44. **Centranthera,** *Br.*

Annual, rigid, scabrid herbs. *Leaves* opposite or upper alternate, oblong

or linear, obtuse, entire or toothed. *Flowers* axillary or in bracteate spikes or racemes, 2-bracteolate. *Calyx* compressed, spathaceous, split on one side; lobes acute or acuminate, cohering or free. *Corolla-tube* long, incurved, dilated above; limb oblique; lobes 5, broad, subequal, spreading, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers meeting in pairs, cells transverse, bases spurred or mucronate, one smaller often empty. *Stigma* dilated, acute. *Capsule* ovoid or subglobose, loculicidal; valves entire, placentiferous in the middle. *Seeds* very numerous, oblong-cuneate, testa lax, reticulate.—Species 4, Indian, Malayan and Australian.

1. **C. grandiflora,** *Benth. Scroph. Ind.* 50, and in *DC. Prodr.* x. 525; erect, stout, scabrid, leaves oblong elliptic or narrowly linear, calyx 1 in. oblong inflated acuminate, corolla yellow. *Wall. Cat.* 3880.

SIKKIM HIMALAYA, alt. 1–5000 ft., *J. D. H.*; and KHASIA MTS., alt. 3–5000 ft.

Stem 1-2 ft., branched. *Leaves* sessile, 1–2 by $\frac{1}{6}$–1 in., rigid. *Flowers* shortly pedicelled. *Calyx-segments* subulate, cohering. *Corolla* $1\frac{1}{2}$–2 in. long, limb 1 in. diam. *Filaments* hairy. *Capsule* globose.

2. **C. Brunoniana,** *Benth. Scroph. Ind.* 50, and in *DC. Prodr.* x. 525; erect, scabridly hispid, leaves linear-oblong, calyx $\frac{1}{2}$ in. oblong-acuminate, corolla yellow. *Wall. Cat.* 3882. C. hispida, *Benth. Fl. Hongk.* 254, *the yellow-fld. plant.*

MARTABAN and TENASSERIM; at Moulmein, *Wallich*, &c.—DISTRIB. China.

Stem 12–18 in. *Leaves* $\frac{3}{4}$–2 in. *Flowers* shortly pedicelled. *Corolla* 1 in. long, limb $\frac{1}{2}$ in. diam.

3. **C. hispida,** *Br. Prodr.* 438; erect, hispid, hoary, leaves oblong or linear-oblong, calyx $\frac{1}{3}$ in. ovoid acute, corolla purplish. *Wall. Pl. As. Rar.* i. 39, t. 45, and *Cat.* 3881; *Benth. in DC. Prodr.* x. 525; *Dalz. & Gibs. Bomb. Fl.* 182; *Miquel Fl. Ind. Bat.* ii. 707. C. nepalensis, *Don Prodr.* 88. Digitalis stricta, *Roxb. Fl. Ind.* iii. 99. Capraria rigida, *Hb. Ham.*

Throughout INDIA; from the Punjab, and Kumaon, ascending to 4000 ft., to Canara, Bengal, Tenasserim and Burma. CEYLON, ascending to 3000 ft.—DISTRIB. Java, China, Philippine Islands, Australia.

Stem 1–2 ft. *Leaves* very variable, usually $\frac{1}{2}$–1 in., and narrowly linear. *Flowers* subsessile. *Corolla* twice as long as the calyx. *Filaments* woolly.

4. **C. procumbens,** *Benth. in DC. Prodr.* x. 525; diffusely branched from the base, rarely erect, hispid, leaves oblong or linear-oblong, calyx $\frac{1}{2}$ in. ovoid-oblong acute, corolla purplish. C. Brunoniana, *Thwaites Enum.* 220, *not of Benth.*

DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 3000 ft.

Root apparently more than annual. *Stems* rarely simple, erect, 6–10 in., usually with straggling branches 4–8 in. long from the root. *Leaves* $\frac{1}{2}$–1 by $\frac{1}{6}$–$\frac{1}{3}$ in. *Flowers* sessile. *Corolla* $\frac{3}{4}$–1 in.—Possibly a variety of *C. hispida*, but the calyx is much larger.

5. **C. humifusa,** *Wall. Cat.* 3883; dwarf, diffusely branched from the base, glabrous or hispidulous, leaves linear, calyx $\frac{1}{6}$ in. ovoid subacute, corolla yellow. *Benth. in DC. Prodr.* x. 525. Razumovia tranquebarica, *Spreng. Syst.* ii. 812. Torenia lepidota, *Roth Nov. Sp.* 281.

BENGAL and BEHAR; at Parusnath, *Clarke.* DECCAN PENINSULA; at Tranquebar.

MALACCA, *Griffith*. CEYLON; south end of the island.—DISTRIB. Java, Borneo, China.

Branches slender, 3–6 in. *Leaves* ½–¾ in. *Flowers* subsessile. *Corolla* ⅓–½ in. long.

45. **SOPUBIA,** *Hamilt.*

Erect herbs. *Leaves* opposite, or the upper alternate, narrow, often laciniate. *Flowers* bracteate, spicate or racemose, pedicels 2-bracteolate. *Calyx* campanulate, 5-toothed or -lobed. *Corolla-tube* short, throat broad; lobes 5, broad, spreading, subequal, 2 upper the inner in bud. *Stamens* 4, didynamous, subincluded; anthers 2 or all meeting in pairs, one cell of each perfect, ovoid, the other small stipitate empty. *Stigma* thickened, subinguiform, obtuse. *Capsule* ovoid or oblong, tip rounded or compressed, retuse or notched, loculicidal; valves entire or 2-fid, separating from the placentiferous axis. *Seeds* numerous, testa lax.—Species 8 or 9, S. African, Indian, Malayan and Australian.

1. **S. delphinifolia,** *G. Don Gen. Syst.* iv. 560; much branched, scaberulous, leaves pinnatisect, segments filiform, flowers subsessile, calyx-teeth longer than the tube subulate, corolla subcampanulate, capsule rounded at the top. *Benth. in DC. Prodr.* x. 522; *Dalz. & Gibs. Bomb. Fl.* 182. Gerardia delphinifolia, *Linn.*; *Roxb. Cor. Pl.* i. 62, t. 90, and *Fl. Ind.* iii. 99; *Wall. Cat.* 3890; *Benth. Scroph. Ind.* 49. G. Heyneana, *Benth. in Wall. Cat.* 3891. Euphrasia Coromandeliana, *Roth*; *Spreng. Syst.* ii. 775.

BANDA, *Edgeworth*. BEHAR; on Parusnath, *Anderson*. DECCAN PENINSULA, from the Concan southwards. CEYLON, ascending to 4000 ft.

Stem erect, 4-grooved, 3–4 ft., spotted with purple. *Leaves* 1 in., segments few, almost as long, flexuous. *Calyx-lobes* linear, erect. *Corolla* 1–1½ in., rose coloured, limb 1 in. diam. *Filaments*, upper hooked lower horned at the tip. *Capsule* oblong, as long as the calyx.

2. **S. trifida,** *Ham. in Don Prodr.* 88; scaberulous, branched above, leaves linear or filiform lower mostly 3-fid upper entire, flowers pedicelled, calyx-teeth triangular, corolla subrotate, capsule retuse at the top. *Benth. in DC. Prodr.* x. 522. Gerardia scabra, *Wall. Cat.* 3889, *not of Linn.*; *Benth. Scroph. Ind.* 49. G. Sopubia, *Benth. in Hook. Comp. Bot. Mag.* i. 210.

TEMPERATE and SUBTROPICAL HIMALAYA; from Kunawur to Sikkim, alt. 3–7000 ft. KHASIA MTS., alt. 3–4000 ft. DECCAN PENINSULA; Nilgherries and Bababoodan Hills, common. CEYLON; elevated parts of the Central province.

Stem slender, 1–2 ft., branches suberect. *Leaves* ¾–1 in., often fascicled. *Pedicels* ¼–¾ in. *Calyx* ⅙ in., woolly within. *Corolla* ½ in. diam., varying from yellow to purple (*Clarke*).

3. **S. stricta,** *G. Don Gen. Syst.* iv. 559; scaberulous, branched, leaves linear entire or sparingly toothed or cut, flowers pedicelled, calyx-teeth lanceolate acute, corolla subcampanulate, capsule compressed at the top. *Benth. in DC. Prodr.* x. 522. Gerardia stricta, *Benth. Scroph. Ind.* 49; *Wall. Cat.* 3887.

SIKKIM HIMALAYA, foot of the hills, *J. D. H.* PEGU, M'Lelland. TENASSERIM; at Moulmein, *Wallich*. BENGAL; at Sumbulpore, *Griffith*.—DISTRIB. Java.

Stem 8–12 in., rigid, simple or fastigiately branched above. *Leaves* 1–1½ in., scattered and fascicled. *Pedicels* ⅙ in. *Calyx* ⅛ in. *Corolla* ⅓ to ½ in. long, limb as broad.

46. **MICRARGERIA,** *Benth.*

Rigid, scabrid, erect herbs, black when dry. *Leaves* alternate, or the lower opposite, linear, entire or 3-multifid. *Flowers* small, in the upper axils, or in long terminal spikes, bracteate and 2-bracteolate. *Calyx* campanulate or hemispheric; teeth 5, broad. *Corolla-tube* exserted, dilated above, often incurved; lobes 5, broad, spreading, entire, subequal, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers free, meeting in pairs, cells distinct subequal attached by their tips, base obtuse. *Stigma* thickened, obtuse. *Capsule* small, globose, loculi- and septi-cidal; valves 4, separating from 2 small globose placentas. *Seeds* numerous, oblong-cuneate, testa lax.—Species 2, a W. African and Indian.

M. Wightii, *Benth. in DC. Prodr.* x. 509; lower leaves pinnatisect, segments few filiform. *Wight Ic.* t. 1417.

SOUTH DECCAN PENINSULA; *Wight*, &c.

Annual, 8–18 in. high. *Stem* naked below, fastigiately branched above; branches long, slender, erect. *Leaves* $\frac{1}{2}$ in., in scattered fascicles, cut into almost filiform spreading segments $\frac{1}{4}$–$\frac{1}{2}$ in. long; upper filiform, entire. *Spikes* very long and slender; flowers distant, subsessile; bracts filiform, longer than the calyx; bracteoles linear. *Calyx* $\frac{1}{10}$ in., hemispheric; teeth triangular. *Corolla-tube* $\frac{1}{3}$ in. long, incurved, pubescent, limb as broad. *Capsule* $\frac{1}{6}$ in. diam. enclosed in the calyx.

47. **LEPTORHABDOS,** *Schrenk.*

Erect, annual, glabrous or glandular-pubescent, twiggy herbs. *Stem* 4-angled. *Leaves* opposite below, alternate above, linear, entire or laciniate or pinnatisect, upper smaller. *Flowers* small, axillary, and in interrupted very slender racemes, bracteate, ebracteolate. *Calyx* tubular-campanulate, 5-toothed or -fid. *Corolla-tube* short; lobes 5, subequal, spreading, broad, entire or notched, 2 upper inner in bud. *Stamens* 4, didynamous, shorter than the corolla; anthers free, cells parallel equal not spurred. *Stigma* shortly dilated, obtuse; ovules 2 in each cell. *Capsule* compressed above at right angles to the septum, obtuse, loculicidal; valves entire, septiferous. *Seeds* 1–2 in each cell, laterally attached, oblong or angled, rugose.—Species 4 or 5, Central Asiatic and N. Indian.

1. **L. Benthamiana,** *Walp. Rep.* iii. 387; glabrous, inflorescence glandular-puberulous, leaves pinnatisect, segments linear or filiform, calyx-lobes ovate-lanceolate. L. virgata, *Benth. in DC. Prodr.* x. 510; *Boiss. Fl. Orient.* iv. 470. L. parviflora, *Benth. l. c.* Gerardia parviflora, *Wall. Cat.* 3888; *Benth. Scroph. Ind.* 48. Dargeria pinnatifida, *Dcne. in Jacq. Voy. Bot.* 116.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–11,000 ft., *Falconer*, &c. WESTERN TIBET; Dras, alt. 10,000 ft., *Thomson*.—DISTRIB. Affghanistan, Persia.

Stem 1–2 ft., slender or rather stout, naked below, simple or fastigiately branched above; branches strict, erect, very slender. *Leaves* 1–3 in., sometimes cut to the base into subequal filiform segments, in others ovate or lanceolate and regularly pinnatisect; segments linear and entire or subpinnatifid. *Racemes* very slender, very many-fld.; pedicels $\frac{1}{10}$–$\frac{1}{6}$ in.; bracts linear, longer or shorter than the pedicels. *Calyx* $\frac{1}{8}$ in.; lobes lanceolate or triangular-ovate, acute, 5-ribbed in fruit. *Corolla* variable in size, about twice as long as the calyx; limb $\frac{1}{6}$ in. diam. *Capsule* $\frac{1}{6}$ in., as long as the calyx.—I can find no difference between the authentically named specimens of *L.*

virgata and *parviflora*; but there are fruiting specimens from Balti in the Shayuk valley of a plant the capsules of which are nearly ⅓ in. long.

2. **L. linifolia,** *Walp. Rep.* iii. 388; leaves linear entire or the lowest 3-fid, calyx-lobes linear-lanceolate as long as the tube. *Benth. in DC. Prodr.* x. 510. Dargeria linifolia, *Dcne. in Jacquem. Voy. Bot.* 116, t. 121.

KASHMIR, in the upper pine forests, *Jacquemont.*

I have seen no specimens of this, which is probably referable to *L. Benthamiana.* Possibly there is but one species of this genus.

TRIBE IX. EUPHRASIEÆ.

48. PHTHEIROSPERMUM, *Bunge.*

(& 50 EMMENOSPERMUM, *Clarke.*)

Annual or biennial, viscid herbs. *Leaves* opposite, pinnatifid. *Flowers* axillary, solitary, sessile or shortly pedicelled, ebracteolate. *Calyx* campanulate, 5-fid, lobes short narrow. *Corolla* 2-lipped, tube broad, dilated above; upper lip very short, erect, lobes 2 folded back; lower longer, broader, spreading, 2-fid, throat open, palate 2-gibbous. *Stamens* 4, didynamous; anthers beneath the upper lip glabrous, cells equal parallel distinct, bases mucronate. *Stigma* spathulate, shortly 2-lobed. *Capsule* compressed, beaked, loculicidal; valves entire, semiseptiferous, at length separating from the placentiferous column. *Seeds* numerous, ovoid, reticulated.—Species 3, a Chinese and Japanese and 2 Indian.

A new genus (*Emmenospermum*) has been proposed by Clarke (and inadvertently introduced into the key, p. 249) for *P. Parishii*, founded on the seeds being minutely reticulated and not striate, a character not supported by habit or any other. The seeds of *P. chinense* are ellipsoid $\frac{1}{40}$ in. long, with a loose pale reticulated testa; those of *P. Parishii* are about half that size, with a dark close testa. Much greater differences occur in the seeds of all large and many small genera of Scrophularineæ.

1. **P. Parishii,** *Hook. f.*; softly hairy, leaves sessile broadly ovate deeply pinnatifid, lobes obtuse, flowers subsessile, corolla-tube much longer than the calyx, upper lip very short truncate 2-toothed, lobes of lower obcordate.

TENASSERIM; at Moulmein, Koli Mts. and Thoungyne, alt. 5000 ft., *Lobb*; Summit of Moolee, alt. 7400 ft., *Parish.*

Stem 3–8 in., simple or branched from the base or upwards, hairs spreading. *Leaves* ¼–⅓ in.; lobes linear, entire or notched. *Calyx* ⅛ in., glandular, 5-cleft to the middle; lobes linear-lanceolate, obtuse. *Corolla* ½ in. long. *Capsule* ¼ in., pubescent. *Seeds* $\frac{1}{80}$ of an inch long, oblong, testa close dark.

2. **P. glandulosum,** *Benth. in Gen. Pl.* ii. 976; glandular-pubescent, leaves sessile 3-partite, segments linear, calyx-lobes unequal, corolla-tube hardly longer than the calyx. Euphrasia? glandulosa, *Benth. in DC. Prodr.* x. 555.

WESTERN HIMALAYA; (in Garwhal?) at Shioli, alt. 6000 ft., *Edgeworth.*

Stem slender, erect, 3–4 in., simple or branched. *Leaves* ¼–⅓ in. *Flowers* few, sessile. *Calyx* $\frac{1}{10}$ in. long. *Corolla* ⅙ in. wide.—The specimens are quite insufficient for a second analysis of the flower.

49. Euphrasia, *Linn.*

Annual or perennial herbs. *Leaves* opposite, toothed laciniate or pal-

matifid. *Flowers* in terminal spikes with large often acutely cut bracts, ebracteolate. *Calyx* tubular or campanulate; lobes 4, equal or connate in pairs, rarely with a minute 5th tooth. *Corolla* 2-lipped, tube dilated above; upper lip erect, concave, 2-lobed, margins replicate; lower larger, not plaited below, 3-lobed, lobes spreading, obtuse or notched. *Stamens* 4, didynamous; anthers beneath the upper lip, cells distinct, parallel, base equally or unequally mucronate or spurred. *Stigma* dilated, entire or with a small dorsal tooth. *Capsule* oblong, compressed, loculicidal; valves septiferous, separating from the placentiferous column. *Seeds* numerous (rarely few), pendulous, oblong, grooved.—Species about 20, of cool regions.

E. officinalis, *Linn.*; *Benth. in DC. Prodr.* x. 552; annual, pubescent or glabrate, leaves sessile ovate or ovate-cordate deeply crenate-serrate, bracts like the leaves, anthers hairy, cells of posticous ones unequally spurred. *Boiss. Fl. Orient.* iv. 472; *Reichb. Ic. Fl. Germ.* xx. t. 1731, 2. E. tartarica, *Fisch. in Spreng. Syst.* ii. 777; *Ledeb. Ic. Fl. Ross.* t. 435. E. depauperata, *Benth. in Wall. Cat.* 3886. E. simplex, *Don Prodr.* 95.

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4–13,000 ft.; Sikkim, alt. 10–12,000 ft., *J. D. H.*—DISTRIB. Affghanistan and N. Persia to Europe, N. Central and East Asia to Japan, N. America.

Stem wiry, 6–18 in., simple or sparingly or fastigiately branched, often naked below; branches slender, erect. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., distant or imbricating, nerves strong. *Spikes* continuous with the foliage, short or long, obtuse, few- or many-fld. *Flowers* very small; bracts imbricating. *Calyx* about equalling the bracts; lobes acute. *Corolla* $\frac{1}{6}$–$\frac{1}{2}$ in. long, white or lilac, with purple veins. *Anthers* brown. *Capsule* included in the calyx or exserted.—Very variable, attaining a much larger size in the Himalaya than in Europe, and being more constant in foliage. Bentham distinguishes two Himalayan varieties; *E. tartarica*, with almost orbicular leaves, remote, subacute bracts, and small corollas hardly exserted from the bracts, and *E. vulgaris*, with ovate or oblong obtusely crenate cauline leaves, sharply serrate bracts, and corolla of very variable size. These, which are both widely distributed in Europe and Asia, present no constant characters in India.

50. EMMENOSPERMUM, *Clarke.*

(See 48, Phtheirospermum.)

51. BARTSIA, *Linn.*

Annual or perennial herbs. *Leaves* opposite, entire crenate serrate or incised. *Flowers* axillary, spicate or racemose, bracteate, ebracteolate. *Calyx* tubular or campanulate, 4-fid. *Corolla* 2-lipped; tube slender, straight or incurved; upper lip erect, concave, entire or notched, margins not replicate; lower convex or bigibbous at the base, lobes 3 spreading. *Stamens* 4, didynamous; anthers under the upper lip, cells distinct equal parallel, bases usually spurred. *Stigma* obtuse or capitate. *Capsule* loculicidal to the middle or higher; valves entire, placentiferous. *Seeds* numerous, pendulous or horizontal, smooth grooved or winged.—Species about 60, in cool and mountain localities.

B. Odontites, *Huds., Fl. Angl.* 268; annual, erect, scabridly pubescent, leaves sessile lanceolate sparingly serrate, spikes subsecund, lower bracts leafy. *Reichb. Ic. Fl. Germ.* t. 1727. Odontites rubra, *Benth. in DC. Prodr.* x. 551. O. serotina, *Boiss. Fl. Orient.* iv. 476. Euphrasia Odontites, *Linn.* E. rubra, *Pers. Syn.* ii. 150.

KASHMIR, alt. 7–8000 ft., *Clarke.*—DISTRIB. Westwards to Europe and N. Africa; N. and Central Asia to Japan?

Stem 6–18 in., erect or ascending, wiry, 4-angled, paniculately branched ; branches ending in leafy spikes. *Leaves* $\frac{1}{4}$–2 in., very variable. *Calyx* campanulate; lobes ovate, acute, equalling the tube. *Corolla* $\frac{1}{2}$ in., pubescent, pink ; upper lip long, entire. *Anthers* exserted, yellow. *Capsule* $\frac{1}{4}$ in., rather longer than the calyx. *Seeds* narrowly oblong.

52. **PEDICULARIS,** *Linn.*

Annual or perennial herbs. *Leaves* alternate opposite or whorled, simple toothed pinnatifid or pinnatisect. *Flowers* bracteate in terminal spikes or racemes, ebracteolate. *Calyx* tubular or campanulate, entire or split above and often below, 2–5-toothed, lateral teeth free or connate entire or crested, lower small or 0. *Corolla* 2-lipped, tube cylindric; upper lip erect, compressed straight falcate annular or decurved, obtuse acute or beaked, lower with 3 spreading erect or deflexed lobes. *Stamens* 4, didynamous ; anthers under the upper lip meeting in pairs; cells distinct, equal, parallel, bases obtuse or rarely awned. *Style* slender, stigma subcapitate. *Capsule* compressed, ovate or lanceolate, falcate or oblique, often obliquely beaked, loculicidal; valves placentiferous, often cohering to the middle. *Seeds* numerous, of various shapes, testa appressed or lax, reticulate pitted striate or ribbed.—Species about 120, northern and mountain plants, with a few S. American and S. Indian.

SERIES I. Cauline leaves whorled, or opposite, or the lower scattered.

* *Upper lip beaked.*

1. **P. pectinata,** *Wall. Cat.* n. 420; usually tall, stout, glabrous, except the often hairy spike, cauline leaves whorled lanceolate pinnatifid or pinnatisect with serrate segments or 2-pinnatifid, calyx-teeth acute entire; corolla-tube short, upper lip inflated sickle-shaped beak long tip twisted. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 560.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 7–11,000 ft.—DISTRIB. Affghanistan.

Stem 6–18 in., simple or branched. *Leaves* 3–6 in., sometimes 4 in. broad, ovate or oblong; petiole long, slender. *Spikes* 2–6 in., lax-fld.; bracts as long as the calyx, ovate or lanceolate. *Calyx* $\frac{1}{2}$ in. long, inflated in fruit. *Corolla* $\frac{3}{4}$ in., rose-red, beak with a double flexure, as long as the tube. *Filaments* hairy. *Capsule* $\frac{1}{2}$ in., ovoid acute, tip exserted. *Seeds* large, $\frac{1}{5}$ in. long, ridged and deeply pitted, pale.

VAR. *pyramidata*; stem sometimes 4-fariously hairy, spikes sometimes 1 ft. long. P. pyramidata, *Royle in Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 560.

7588 2. **P. robusta,** *Hook. f.*; pubescent, stems short very stout curved ascending, radical leaves many linear coriaceous pinnatifid or pinnatisect, segments oblong crenate, cauline few opposite or alternate, racemes short, bracts pinnatifid, calyx-lobes crenate, corolla-tube not longer than the calyx, upper lip erect inflated then sharply decurved and shortly beaked. P. pectinata, *Herb. Ind. Or. H. f. & T.* (*the Sikkim plant only*).

ALPINE SIKKIM; Samdong, alt. 15-16,000 ft., *J. D. H.*, *Elwes.*

Rootstock long, stout, cylindric. *Stems* several from the rootstock, 3–6 in. long or less, as thick as a crow-quill, sometimes very short. *Radical leaves* numerous, 2–5 by $\frac{1}{2}$–$\frac{3}{4}$ in., lobes numerous and close-set; petiole very stout. *Racemes* dense-fld.; bracts leafy, crenate or pinnatifid; flowers $\frac{3}{4}$ in. long. *Calyx* split half-way down, lobes small. *Corolla* red-purple; upper lip $\frac{1}{3}$ in. long, glabrous, lower $\frac{1}{2}$–$\frac{3}{4}$ in. broad, 3-lobed. *Capsules* $\frac{2}{3}$ in. long, broadly oblong, tip rounded with a lateral point. *Seeds* $\frac{1}{10}$ in. long, subellipsoid, subacute, finely striate, not punctulate, pale.—Clarke collected on Singa-

lelah, in Sikkim, alt. 11,000 ft., a plant with the habit of this, but in fruit only, with straight oblong-lanceolate acuminate capsules 1 in. long, and seeds nearly 1/8 in. long, striate and punctulate.

3. **P. tenuirostris,** *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561; tall, erect, leafy, stem glabrous or 4-fariously hairy, cauline leaves whorled sessile lanceolate pinnatifid segments obtuse crenulate, spikes stout dense-fld., bracts ovate caudate-acuminate, corolla-tube exserted or not, upper lip erect inflated then decurved with a long flexuous beak.

WESTERN HIMALAYA; from Kashmir to Lahul, alt. 7–11,000 ft.—DISTRIB. Affghanistan.

Stem 2–3 ft., stout, simple or branched. *Radical leaves* petioled; cauline 4 in a whorl, 2–5 by 1/2–2 in., lobes numerous. *Bracts* ciliate or hirsute, exceeding the calyx. *Corolla* yellow, 3/4 in. long, upper lip much inflated at the base, beak variable; lower broadly obcordate with a small median lobe. *Capsule* not seen.

4. **P. gracilis,** *Wall. Cat.* 413; stem tall slender branched 4-fariously hairy, cauline leaves whorled deeply pinnatifid, segments oblong-lanceolate obtuse serrate crenate or pinnatifid, racemes or spikes slender lax-fld. or flowers all axillary distant, corolla-tube half as long as the calyx, upper lip falcate swollen in the middle, erect with a horizontal flexuous slender beak, much longer than the small lower broadly obovate or orbicular 3-lobed. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561. P. stricta & P. Brunoniana, *Wall. Cat.* 414, 422.

TEMPERATE and ALPINE HIMALAYA; from Kashmir, alt. 6–10,000 ft., to Sikkim, alt. 8–12,000 ft.—DISTRIB. Affghanistan.

Stem 6–24 in.; branches opposite or whorled, simple or divided, all very slender. *Leaves* 1–2 by 3/4–1 1/2 in., rarely hairy. *Spikes* or *racemes* 3–6 in.; bracts pinnatifid, longer than the calyx; flowers pedicelled or sessile. *Calyx* 1/4 in.; lobes obtuse or crenulate. *Corolla* rose-purple; tube 1/2 in., slender, beak decurved as long as the lower lip which is very variable in size and shape. *Capsule* 1/4–1/3 in., shortly oblong, acute, half or only the tip exserted. *Seeds* very minute, 1/30 in. long, broadly ovoid, pale, striate and with shallow pits.

VAR. *khasiana*; puberulous or glabrate, leaves very short 1/2–3/4 in., lobes short close, bracts often shorter than the calyx.—Khasia Mts., alt. 5–6000 ft., *Griffith*, &c.

5. **P. porrecta,** *Wall. Cat.* 423; stem short ascending glabrous or 2–4-fariously hairy, cauline leaves 1–2 pair opposite oblong pinnatifid lobes oblong obtuse serrate, raceme short few-fld., corolla-tube twice as long as the calyx, upper lip sickle-shaped erect inflated then shortly decurved and acutely beaked, as long as the lower lip. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561.

ALPINE HIMALAYA; "towards Kashmir," *Royle*; Kumaon, *Wallich*; Sikkim, alt. 14–15,000 ft., *J. D. H.*

Rootstock perennial, stout. *Stems* several from the rootstock, 4–6 in. *Leaves* 1/4–1 in., radical petioled, cauline sessile or petioled. *Racemes* 4–6 fld., pubescent; bracts pinnatifid; flowers 3/4 in. long. *Calyx-lobes* obtuse, crenulate. *Corolla-tube* slender, 1/2–3/4 in. *Capsule* 1/2 in., oblong, nearly straight, acute. *Seeds* 1/12 in. long, sub-ellipsoid, pale, finely striate and punctulate.

6. **P. brevifolia,** *Don Prodr.* 94; pubescent or villous, stem erect simple, leaves few, cauline opposite or whorled oblong pinnatifid lobes short toothed, spikes few-fld. subcapitate, corolla-tube twice as long as the calyx, upper lip falcate erect then inflated with a long straight or decurved beak longer than the lower lip. *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* x. 561. P. lanigera, *Wall. Cat.* 419.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 13–16,000 ft.

Rootstock stout. *Stem* 4-8 in., stout or slender, rarely glabrate. *Leaves* rarely 1 in.; cauline sessile. *Spikes* 1-$1\frac{1}{2}$ in. broad, top rounded; flowers and fruit much as in *P. porrecta*, of which this resembles a hairy form, but the beak is much longer.

7076 7. **P. flexuosa,** *Hook. f.*; slender, sparsely hairy or glabrate, stems flaccid elongate decumbent diffusely branched, cauline leaves opposite petioled ovate or oblong 2–pinnatifid lobes sharply toothed, flowers axillary and in lax or dense leafy spikes or heads, corolla-tube $\frac{3}{4}$-$1\frac{1}{4}$ in., limb large, upper lip erect then inflated with a stout horizontal beak shorter than the lower lip. Pedicularis n. 5, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA; alt. 10–13,000 ft., *J. D. H.*, *Clarke.*

Stems 1–2 ft., curved (dwarf forms 6–8 in. also occur), flexuous. *Leaves* 2–4 in., ovate oblong or oblong-lanceolate, flaccid, irregularly toothed. *Spikes* or racemes usually capitate in flower and fruit, or elongating in fruit; bracts pinnatifid, longer than the calyx. *Calyx* $\frac{1}{4}$ in., lobes crenulate. *Corolla* rosy, tube many times longer than the calyx; limb $\frac{2}{3}$ in. diam. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. long, ovate-oblong or lanceolate, straight, acute. *Seeds* $1\frac{1}{4}$ in. long, ellipsoid, obtuse, smooth or obscurely reticulate, dark.

7482 8. **P. integrifolia,** *Hook. f.*; softly glandular-pubescent, stems short stout simple, cauline leaves few opposite sessile oblong obtuse crenulate, flower axillary and in short heads, corolla-tube $\frac{1}{2}$ in., upper lip large erect then greatly inflated and narrowed into a very long slender flexuous beak. Pedicularis n. 8, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA; Tungu, alt. 12–14,000 ft., *J. D. H.*

Rootstock very stout. *Stems* 4–6 in., ascending. *Radical leaves* crowded, $1\frac{1}{2}$–2 in., narrowly linear-lanceolate, subacute, margins recurved obscurely crenate, glandular-pubescent on both surfaces; cauline erect, $\frac{3}{4}$–1 in. *Spikes* capitate, oblong; bracts leaf-like, but broad, as long as the calyx. *Calyx* $\frac{1}{2}$ in., lobes crenate. *Corolla* dark purple, tube twice as long as the calyx; beak longer than the tube, flexuous. *Capsule* not seen.

*** Upper lip of the corolla rounded at the end, not or very shortly beaked.*

7318 9. **P. globifera,** *Hook. f.*; dwarf, stem stout ascending 4-fariously hairy, leaves whorled short linear-oblong pinnatifid segments crowded crenulate, spikes capitate erect or nodding hirsute many- and dense-fld., corolla-tube short, upper lip short erect, tip rounded sharply deflexed acute or shortly beaked. Pedicularis n. 10, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA; Kongra Lama, alt. 14–15,000 ft., *J. D. H.*

Rootstock stout. *Stems* 2–4 in. *Radical leaves* 1 in., very shortly petioled, lower cauline sessile, $\frac{1}{2}$ in. *Spikes* globose or oblong, top rounded; bracts as long as the calyx, rounded, crenulate; flowers $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Calyx* $\frac{1}{6}$ in. long, hirsute, lobes obtuse, very short. *Corolla* dark purple; tube broad, half as long again as the calyx; upper lip with a sharply inflexed but hardly beaked tip.—The specimens are from one locality only, and not in fruit; they resemble *P. brevifolia*, Don, a good deal, but the flowers are more numerous and denser, and the upper corolla lip is hardly beaked. *P. Korolkowi*, Regel, is another closely allied plant, differing in the glabrous calyx with longer teeth.

10. **P. cheilanthifolia,** *Schrenk in Fisch. & Mey. Enum. Pl. Nov. Fasc.* ii. 19; stems erect or ascending simple or branched 4-fariously hairy, cauline leaves whorled petioled linear pinnatifid segments crenate, spike dense- or lax-fld. villous, corolla-tube twice as long as the calyx, upper lip much longer than the lower arched dilated at the apex or not, tip deflexed

obtuse. *Benth. in DC. Prodr.* x. 562. P. abrotanifolia, *Herb. Ind. Or. H. f. & T., not of Bieberst.*

WESTERN TIBET; Nubra and Ladak, alt. 11–15,000 ft., *Thomson*, &c.; Balch Pass, N. of Kumaon, alt. 16,500 ft., *Strachey & Winterbottom*.—DISTRIB. Soongaria.

Rootstock stout. *Stems* many, 6–12 in., rarely branched. *Radical leaves* 1–4 by $\frac{1}{6}$–$\frac{1}{3}$ in., petiole slender, crenatures often callous; cauline opposite and 3–6 in a whorl, $\frac{1}{2}$–2 in. long. *Spikes* 1–4 in., stout, very villous; bracts longer than the calyx, entire or toothed; flowers $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{4}$ in.; lobes short, obtuse. *Corolla* pink, lower lip small very short. *Capsule* oblong-lanceolate, acuminate, nearly straight, half exserted. *Seeds* $\frac{1}{12}$ in., ellipsoid, subacute, striate and punctate, pale.—Differs from *P. abrotanifolia*, Bieb., in the pink flowers, and long upper lip of the corolla.

11. **P. verticillata,** *Linn.*; *Benth. in DC. Prodr.* x. 563; sparingly hairy, stems erect or ascending, cauline leaves few whorled sessile or subsessile oblong or linear-oblong pinnatifid segments rather distant ovate subpinnatifid and crenulate, spikes broad short often interrupted, corolla-tube twice as long as the calyx, upper lip small nearly straight subtruncate much smaller than the large broad lower lip. *Jacq. Fl. Austr.* t. 206; *Gaertn. Fruct.* i. 246, t. 53, f. 5; *Reichb. Ic. Fl. Germ.* t. 1762, f. 1–14; *Boiss. Fl. Orient.* iv. 485. P. Stevenii, *Bunge in Ledeb. Fl. Alt.* ii. 427.

ALPINE HIMALAYA; Kunawur, *Royle*; Lahul, *Jaeschke*; Sanch Pass, alt. 14–15,000 ft., *Ellis*. Sikkim, alt. 11–13,000 ft., *J. D. H.*—DISTRIB. From the Pyrenees to the Himalaya, N. Asia, N. America, and the Arctic regions.

Rootstock rather slender. *Stems* 4–10 in. high. *Radical leaves* 2–3 in., petioled; cauline shorter, whorled. *Spikes* 1–3 in. by $1\frac{1}{2}$ broad, lower whorl of flowers often distant, with leafy bracts, upper dense; bracts usually longer than the calyx, pinnatifid or crenate; flowers $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{4}$ in.; lobes broad, very short. *Corolla* pink-purple; tube broad, lower lip $\frac{1}{2}$–$\frac{2}{3}$ in. diam. *Capsule* $\frac{1}{2}$ in., oblong-lanceolate, straight, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{16}$ in. long, rather broad, finely striate and punctulate, pale.

12. **P. denudata,** *Hook. f.*; nearly glabrous, stems long simple very slender, cauline leaves in few distant whorls very short sessile oblong pinnatifid pubescent, segments crenate, spikes elongate interrupted, bracts whorled pinnatifid longer than the flowers, corolla-tube longer than the calyx, upper lip abruptly deflexed longer than the lower, tip subacute. Pedicularis n. 11, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 12–13,000 ft., *J. D. H.*

Stems solitary or many from the root, 8–12 in., with 1–2 whorls or pairs of leaves. *Root-leaves* evanescent, small, petioled; cauline 4 in a whorl, $\frac{1}{2}$–1 in. long, obtuse. *Spikes* interruptedly whorled; lower flowers with spreading bracts larger than the cauline leaves; flowers $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{8}$ in.; lobes short, crenate. *Corolla* pink. *Capsule* not seen.—Near *P. verticillata*, differing in the very small lower lip.

13. **P. mollis,** *Wall. Cat.* 415; tall, stout, erect, hirsute or glabrate, simple or with whorled slender branches, leaves whorled ovate or oblong pinnatifid puberulous segments linear crenate or again pinnatifid, spikes elongate interrupted, calyx-lobes oblong crested, upper lip narrow straight much longer than the lower tip rounded. *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* x. 564; *Bot. Mag.* t. 4599.

ALPINE HIMALAYA and WESTERN TIBET; Nubra, alt. 11–12,000 ft., *Thomson*; Nepal, *Wallich*; Sikkim, alt. 10–14,000 ft., *J. D. H.*

Annual. *Stem* 2–3 ft., sometimes as thick as the little finger, strict, hollow. *Leaves* all cauline in several tiers, 4–5 in a whorl, 1–2 by $\frac{1}{2}$–$1\frac{1}{2}$ in., segments not crowded. *Spikes* on the branches and main stem 6–16 in., strict; flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long, in superposed but separated whorls; bracts pinnatifid, longer or shorter than the

flowers. *Calyx* $\frac{1}{4}$ in., ovoid; lobes oblong. *Corolla* dark pinkish purple. *Capsule* $\frac{1}{4}$–$\frac{1}{2}$ in., tip exserted, ovoid, finely acuminate. *Seeds* $\frac{1}{14}$ in., broad, flattened, punctate, pale.—Described as perennial by Bentham, but the root appears to be clearly annual. Resembles *P. gracilis,* especially in fruit.

14. **P. pycnantha,** *Boiss. Diagn.* i. xii. 45, and *Fl. Orient.* iv. 484; short, stout or slender, sparsely hairy or glabrous, leaves long-petioled, radical many, cauline few opposite and whorled all lanceolate or ovate-lanceolate pinnatifid segments linear acute recurved toothed or subpinnatfid, spikes oblong dense-fld., calyx-lobes subulate, corolla-tube longer than the calyx, upper lip linear straight rather longer than the lower tip rounded. P. Alberti, *Regel, Descr. Pl. Nov. fasc.* vii. 67.

N.W. Himalaya; Lahul, *Jaeschke*; Hazara, alt. 6–7000 ft., *Stewart.*—Distrib. Affghanistan, N. Persia, Turkestan.

Rootstock stout, with fleshy tuberous root-fibres, and crowned with membranous sheaths. *Stems* several, 3–6 in. high. *Radical leaves* 4–6 by 1–$1\frac{1}{2}$ in.; petiole 1–2 in.; segments very variously and irregularly cut or serrate, rather flaccid; cauline more shortly petioled. *Spikes* 1–4 in.; bracts lanceolate, acuminate, longer than the calyx; flowers $\frac{3}{4}$ in. long. *Calyx* enlarged and $\frac{1}{2}$ in. long in fruit; lobes very variable, narrow, sometimes elongate. *Corolla* pink. *Capsule* shortly oblong, acute, shorter than the calyx. *Seeds* large, $\frac{1}{8}$ in. long, ellipsoid, obtuse, striate and punctate, pale.—Boissier describes the corolla-tube as scarcely longer than the calyx, but in Kotschy's original specimens, and in Stewart's, and in Aitchison's from the Kurrum Valley, the tube is considerably longer.

Series II. Cauline leaves alternate.

* Upper lip of corolla beaked.

§ Tube of the corolla shortly exceeding the calyx; upper lip annular or sickle-shaped, hirsute (or glabrate in *P. Clarkei* and *excelsa*).

15. **P. trichoglossa,** *Hook. f.*; hirsute or glabrate, stem stout strict erect leafy, leaves alternate sessile linear obtuse pinnatifid to the middle lobes rounded irregularly toothed, spike strict lax-fld., bracts ovate entire, calyx-lobes ovate crenate, corolla purple upper lip annular densely woolly with a glabrous incurved beak. Pedicularis n. 27, *Herb. Ind. Or. H. f. & T.*

Sikkim and E. Nepal Himalaya; Wallanchoon, Momay and Tungu, alt. 12–13,000 ft., *J. D. H.*

Stem 8–16 in., sometimes as thick as a swan's quill, unbranched. *Leaves* 2–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., obtuse, lobules very many. *Spikes* 3–6 in.; bracts longer than the calyx, tips sometimes narrowed and crenate; flowers $\frac{3}{4}$ in. long. *Calyx* broadly oblong, villous; teeth ovate-lanceolate, obtuse. *Corolla-tube* not exceeding the calyx; upper lip turgid in the middle; lower with broadly cuneate or orbicular glabrous lobes. *Capsule* $\frac{1}{2}$ in., shortly oblong, obtuse, turgid, nearly included in the calyx. *Seeds* broad, $\frac{1}{16}$ in. diam., irregularly shaped, deeply reticulate, pale.

16. **P. Clarkei,** *Hook. f.*; more or less hirsute, stem stout strict erect leafy, leaves alternate sessile pinnatifid, lobes ovate deeply irregularly toothed, spikes strict dense-fld., bracts long pinnatifid, calyx-lobes slender, corolla purple upper lip sparsely hairy abruptly decurved from the middle beak nearly straight. Pedicularis n. 28, *Herb. Ind. Or. H. f. & T.*

Alpine Sikkim Himalaya, alt. 12–13,000 ft.; Yeumtong and Tungu, *J. D. H.*; Jongri, *Clarke.*

Stem 16–20 in., sometimes as thick as the middle finger. *Leaves* 3–5 by $\frac{1}{2}$ in., lobes spreading, rachis winged between them. *Spike* 2–6 in.; bracts with a broad base and slender long crenate-pinnatifid tip, usually longer than the calyx and sometimes

than the flowers; flowers $\frac{3}{4}$ in. long. *Calyx* oblong, villous, lobes rather long and slender entire or crenate. *Corolla* red or purple, tube rather longer than the calyx; lower lip small, narrow, shorter than the upper. *Capsule* as in *P. lachnoglossa*. *Seeds* large, very irregularly obtusely angled and compressed, $\frac{1}{6}$ in. long, deeply reticulate, pale.

2034 17. **P. lachnoglossa,** *Hook. f.*; stem simple strict 1–2-leaved, radical leaves petioled linear-lanceolate pinnatisect, segments very many and regular equidistant linear crenate, raceme strict, flowers distant, bracts lanceolate longer than the calyx, upper lip inflated woolly with a straight horizontal or deflexed beak lower with 3 narrow lobes. Pedicularis n. 32, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 14,000 ft., *J. D. H.*

Rootstock perennial? crowned with slender membranous leaf-sheaths. *Stem* as thick as a crow-quill. *Radical leaves* 4–6 by $\frac{1}{2}$–$\frac{3}{4}$ in., petiole and rachis slender, segments 30–40, at regular intervals, $\frac{1}{10}$ in. broad. *Racemes* 4–8 in.; bracts slender, crenulate, erect; pedicels very short; flowers appressed to the rachis, $\frac{3}{4}$ in. long, red-purple. *Calyx* $\frac{1}{2}$ in., glabrous, oblong, lobes lanceolate not crested. *Corolla-tube* not exceeding the calyx; upper lip sickle-shaped inflated in the middle, beak straight much larger and longer than the lower, which has 3 small obovate acute ciliate lobes. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., lanceolate, finely acuminate, twice as long as the calyx. *Seeds* $\frac{1}{8}$ in. long, subellipsoid, base appendaged, dark, faintly striate and punctate.

2031 18. **P. excelsa,** *Hook. f.*; stem glabrous very tall branched leafy, leaves large alternate petioled bipinnatifid or pinnatisect below, pinnæ linear-oblong distant, lobes or segments irregularly toothed, racemes long strict many-fld. pubescent, calyx small glabrous teeth very small, upper lip of corolla with villous margins produced into a slender incurved tail longer than the lower tip entire. Pedicularis n. 27, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Yeumtong, in the Lachen Valley, alt. 12,000 ft., *J. D. H.*

Stem 2–4 ft., as thick as the middle finger below, shining, hollow; branches ascending, slender, long, incurved. *Leaves* scattered, flaccid, 6–12 by 2–5 in.; pinnæ spreading, 1–2$\frac{1}{2}$ in. long, rachis puberulous winged with lobules between the segments above, naked and slender below; petiole 2–4 in., slender. *Racemes* a foot long and under, rather dense-fld.; bracts pinnatifid, small, pedicels $\frac{1}{8}$–$\frac{1}{4}$ in.; flowers small, $\frac{1}{3}$ in. long. *Calyx* $\frac{1}{6}$ in., spathaceous, broadly oblong, split to the base, mouth oblique, minutely toothed. *Corolla-tube* not exceeding the calyx; upper lip with an oblong inflated base usually villous along the margins contracted into an incurved tail; lower lip narrow, with a small rounded median lobe. *Capsule* $\frac{2}{3}$ in. long, oblong-ovate, 4 times as long as the calyx, tip rounded with an apiculus at one side. *Seeds* $\frac{1}{12}$ in., black, minutely reticulate.—I regret having no note of the colour of the flower of this majestic species, which was, I believe, red-purple.

§§ Tube of the corolla not or very little longer than the calyx; upper lip quite glabrous.

19. **P. macrantha,** *Klotzsch in Reise Pr. Wald. Bot.* 107, t. 58; nearly glabrous or hairy, stem erect or ascending short or long leafy, leaves radical and alternate long-petioled linear pinnatifid or pinnatisect segments short ovate or oblong toothed or pinnatifid with acute teeth, racemes short dense-fld. or the lower or all the flowers axillary, bracts leaf-like, flowers large pink, calyx-lobes crested, corolla-tube not exceeding the calyx, upper lip sickle-shaped tumid with a short beak, lower very large. Pedicularis n. 7, *Herb. Strach. & Winterb.*

WESTERN and CENTRAL HIMALAYA; Nepal, *Hoffmeister, J. Scully*; Garwhal, at Kulhara, alt. 11,000 ft., *Strachey & Winterbottom.*

Root of many fleshy stout fusiform fibres. *Stem* 4–24 in., sometimes as thick as

a swan's quill. *Leaves* 4–6 by $\frac{1}{3}$–$\frac{2}{3}$ in., flaccid; segments distant; rachis winged or not; petiole often as long as the blade. *Flowers* 1 in. long; pedicels $\frac{1}{8}$–1 in.; bracts often exceeding the flowers and bipinnatifid. *Calyx* turgid, $\frac{3}{4}$ in. long, lobes large, nerves distinct. *Corolla* with the upper lip large broad, at the base erect or reflexed, then horizontal with an incurved short beak; lower $1\frac{1}{2}$ in. broad, lobes orbicular, the median smallest. *Capsule* (unripe) $\frac{2}{3}$ in. long, oblong-lanceolate, tip exserted rounded with a lateral point.—Resembles *P. megalantha*, but the short corolla-tube and large upper lip are very different.

7533 20. **P. Elwesii,** *Hook. f.*; glabrous or puberulous, stem stout decumbent or ascending, few-leaved, leaves radical and alternate all shortly petioled linear pinnatifid or pinnatisect, lobes oblong short obtuse coarsely crenate or lobulate, racemes short, flowers very large purple, calyx nerveless pubescent lobes crested, corolla-tube not exceeding the calyx, upper lip inflated sickle-shaped with an incurved beak much smaller than the very broad lower lip. Pedicularis n. 24, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 12–14,000 ft., *J. D. H.*, *Elwes.*

Rootstock perennial? *Stem* as thick as a goose-quill, rarely 1 ft., curved. *Radical leaves* numerous, 5–7 by $\frac{1}{2}$–$\frac{3}{4}$ in., puberulous beneath; petiole short, $\frac{1}{4}$–$\frac{3}{4}$ in., stout; cauline similar. *Racemes* very short; bracts foliaceous, pedicels $\frac{1}{6}$–$\frac{1}{3}$ in.; flowers $1\frac{1}{2}$ in. long. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., cylindric, puberulous, split $\frac{1}{4}$ way down, mouth with 2 crenate lobes. *Corolla* dark-purple, upper lip with the inflated portion suddenly contracted into the short incurved beak; lower erect enclosing the upper, 1 in. broad, of a small medial and two lateral very large rounded lobes. *Capsule* not seen.—The calyx of this species is quite unlike that of *P. macrantha*, being terete puberulous and without apparent nerves.

§§§ Tube of the corolla more than twice as long as the calyx; upper lip glabrous, sickle-shaped or annular, not inflated in the middle.

21. **P. megalantha,** *Don Prodr.* 94; pubescent or villous, stem tall stout erect leafy, leaves alternate long-petioled oblong-lanceolate pinnatifid, lobes short or long crenate or again pinnatifid, racemes at length lax-fld., bracts pinnatifid, calyx-lobes crested, corolla-tube twice as long as the calyx, upper lip annular gradually narrowed from the base and produced into a long slender tail, lower very large. *Benth. in DC. Prodr.* x. 564; *Wall. Cat.* 411; *Regel Gartenfl.* t. 943.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir, alt. 7–14,000 ft., to Sikkim, alt. 11–15,000 ft.

Stem 1–2 ft., solitary or several from the root, often as thick as a swan's quill, hollow. *Radical leaves* 2–10 in., 2-pinnatifid; petiole slender; cauline sometimes as long. *Racemes* 4–10 in.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; lower bracts longer than the flowers. *Calyx* $\frac{2}{3}$ in. long, inflated, hirsute, nerves strong. *Corolla-tube* very slender, $\frac{2}{3}$–1 in.; upper lip slender, lower 1 in. broad. *Capsule* $\frac{3}{4}$–$1\frac{1}{4}$ in. long, half exserted, linear-oblong, acute. *Seeds* $\frac{1}{6}$ in. long, finely reticulate.—The colour of the flowers is variously noted as yellow and rose-pink; in Sikkim they are rose-purple, in Regel's figure they are golden yellow.

22. **P. bicornuta,** *Klotzsch in Reis. Pr. Waldens. Bot.* 109, t. 61; pubescent or hirsute, stem usually very stout tall erect simple leafy, leaves alternate all petioled linear or linear-oblong pinnatifid to the middle lobes rounded crenate or lobulate, spikes or racemes long stout many-fld., bracts crenate, calyx-lobes crested, corolla yellow, upper lip annular produced into a slender curved bifid tail, lower very large. P. eximia, *Watt in Journ. Linn. Soc.* xviii. 381, t. 13. Pedicularis n. 23, *Herb. Ind. Or. H. f. & T.*

WESTERN ALPINE HIMALAYA and WESTERN TIBET, from Kashmir to Kunawur, alt. 9–13,000 ft., *Falconer*, &c.—DISTRIB. Affghanistan, Yarkand and Kashgar.

Root of stout fleshy fibres. *Stem* 6–24 in. high, often as thick as the thumb; small specimens are stemless, the raceme or spike apparently springing from the root. *Radical leaves* numerous in small stemless specimens, evanescent in large, blade 4–12 by $\frac{1}{2}$–$1\frac{1}{2}$ in., lobes very many, close-set; cauline leaves like the radical; petiole 1–2 in. *Raceme* often 8 in. long, with many rather crowded flowers; bracts usually shorter than the calyx; pedicels 0–$\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in. long, broadly oblong, laxly hirsute. *Corolla-tube* from a little longer to twice as long as the calyx; upper lip often sigmoid or cycloid, lower 1–$1\frac{1}{2}$ in. broad. *Capsule* 1–$1\frac{1}{4}$ in. long, oblong-lanceolate finely acuminate, twice as long as the calyx. *Seeds* $\frac{1}{8}$ in. long, pale, striate and reticulate.

23. **P. bella,** *Hook. f.*; dwarf, stemless, or nearly so, radical leaves tufted obovate obovate-oblong or subspathulate crenate densely pubescent, pedicels axillary, corolla dark purple tube long slender, upper lip small annular very much shorter than and enveloped in the very large broad lower. Pedicularis n. 22, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Kongra Lama, alt. 16,000 ft., *J. D. H.*

Root apparently annual. *Leaves* 1 in., narrowed into a broad petiole, densely hoary-tomentose on both surfaces. *Flowers* rather numerous; pedicel $\frac{1}{6}$–$\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., tubular, hoary; lobes large, rounded, crenate. *Corolla* very large for the size of the plant; lower lip forming a very broadly funnel-shaped cup 1 in. diam., in which the short upper lip nestles. *Capsule* $\frac{2}{3}$–$\frac{3}{4}$ in. long, narrowly oblong, subfalcate, tip acute oblique. *Seeds* pale, striate and deeply pitted.—A singular and very beautiful species; the corolla resembles that of *P. Perrottetiana,* in its capsular form.

24. **P. siphonantha,** *Don Prodr.* 95; glabrate or sparsely pubescent or hirsute, stems many from the root slender and leafy, rarely solitary with only radical leaves, leaves petioled linear-oblong pinnatifid or pinnatisect, lobes many short crenulate, flowers axillary and in terminal racemes or heads, calyx-lobes crested, corolla pink, tube very slender 3–6 times as long as the calyx, upper lip a slender annular horn gradually narrowed from the base to the point, lower broadly 3-lobed. *Wall. Cat.* n. 417; *Benth. in DC. Prodr.* x. 565. P. Hookeriana, *Wall. Cat.* 421; *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* 564. P. punctata, *Dcne.*, and P. labellata, *Jacquem. mss.*, *Dcne. in Jacquem. Voy. Bot.* 117, 118, t. 122, 123. P. himilaica & Hoffmeisteri, *Klotzsch in Reise Pr. Waldem. Bot.* 107, 108, t. 58, 60.

ALPINE HIMALAYA and WESTERN TIBET, from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Affghanistan.

Rootstock perennial? *Stems* 2–10 in. erect or ascending. *Leaves* 2–6 by $\frac{1}{4}$–$1\frac{1}{2}$ in., lobes or segments obtuse, cauline and radical alike. *Racemes* short or long; bracts leaf-like; pedicels of the lower flowers sometimes 1 in. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., hirsute or glabrate, nerves distinct. *Corolla* rose-pink, tube very slender, sometimes 2 in.; upper lip longer than the broad lower. *Capsule* $\frac{1}{2}$–$\frac{1}{3}$ in. long, broadly oblong, oblique, acute, half exserted or less. *Seeds* $\frac{1}{12}$–$\frac{1}{10}$ in., oblong, obtuse, base apiculate, striate.—Varies greatly in the size of the corolla and length of its tube.

§§§§. Tube of the corolla at least twice as long as the calyx, upper lip sickle-shaped, glabrous, inflated in the middle.

a. *Radical leaves numerous; stem erect or ascending, usually stout.*

25. **P. carnosa,** *Wall. Pl. As. Rar.* ii. 44, t. 154, and *Cat.* 418; hoary-pubescent, or glabrate, stem erect branched at the base long strict leafy, cauline leaves alternate shortly petioled oblong or linear-oblong obtuse narrowed at the base crenate, flowers laxly racemed rose-purple, bracts leafy, calyx-lobes crested, corolla-tube twice as long as the calyx, upper lip arched decurved from the inflated middle acutely beaked. *Benth. Scroph.*

Ind. 54, and in *DC. Prodr.* x. 580. ? Rhinanthus bifidus, *Ham. in Don Prodr.* 94.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–9000 ft. KHASIA MTS.; Kala pane, &c., alt. 5–6000 ft., *J. D. H. & T. T.*

Annual. *Stem* 4–18 in., rather slender, strict or flexuous, usually tomentose or villous above, branches ascending. *Leaves* 1–3 by $\frac{1}{3}$–$\frac{2}{3}$ in., often scabrid, narrowed into the short petiole; radical often elliptic or oblanceolate, cauline narrower; crenatures broad, rounded, sometimes crenulate. *Racemes* or spikes 1–6 in., very lax; bracts often longer than the flowers; pedicels slender very short or 0; flowers $\frac{2}{3}$ in. long. Calyx $\frac{1}{3}$ in., narrow in flower, hirsute or glabrous, lobes very short, fruiting broadly oblong. *Corolla-tube* rarely less than twice as long as the calyx; upper lip inflated in the middle, longer than the lower, which is $\frac{3}{4}$ in. broad and shallowly 3-lobed. *Capsule* broadly oblong, acute, shortly exserted. *Seeds* minute, orbicular, $\frac{1}{24}$ in. diam., compressed, black, punctulate.—Bentham refers to this Don's *Rhinanthus bifidus*, which differs in the hirsute upper lip of the corolla according to Don's description. Very near the N. Asiatic and Japanese *P. resupinata*, of which the leaves are sessile, or if petioled broad at the base and doubly crenate.

26. **P. rhinanthoides,** *Schrenk in Fisch. & Mey. Enum.* 22; glabrous except above, stems short ascending simple 1–2-leaved, radical leaves petioled linear or oblong pinnatifid or pinnatisect, lobes short oblong obtusely lobulate and crenate, racemes short, calyx hirsute strongly nerved, corolla-tube 2–3-times as long as the calyx, upper lip sickle-shaped inflated in the middle with a slender incurved or sigmoid beak. *Benth. in DC. Prodr.* x. 565. P. elephantoides, *Benth. Scroph. Ind.* 23, and in *DC. l. c.* 564. P. Elephas, *Boiss. Diagn. Ser.* 1, iv. 81, and *Fl. Orient.* iv. 489.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11–13,000 ft.—DISTRIB. Affghanistan, Central Asia, Persia.

Stems one or more from a perennial? rootstock, 4–10 in., stout, curved, usually quite glabrous. *Radical leaves* 2–3 by $\frac{1}{3}$–$\frac{1}{2}$ in., lobes variable; petiole usually stout, $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* very short; bracts leaf-like; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in.; flowers 1–1$\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in., membranous, sparsely villous, shortly cleft, and with 2 short crenate teeth. *Corolla* pale or bright pink; lower lip $\frac{2}{3}$–1 in. diam., lateral lobes large rounded, median small. *Capsule* $\frac{3}{4}$ in. long, oblong-lanceolate, straight or curved, obtuse with a lateral point, $\frac{1}{3}$–$\frac{1}{2}$ exserted from the calyx. *Seeds* $\frac{1}{12}$ in. long, oblong, obtuse, obscurely striate and punctulate, base shortly appendaged.—The Affghan specimens have more glabrous calyxes and longer capsules.

27. **P. tubiflora,** *Fisch. in Stev. Monogr. Pedic.* 30; glabrous or nearly so, stems many from the root short leafy, radical leaves very many petioled linear pinnatifid or pinnatisect lobes many short crenate, flowers axillary in very short racemes, bracts leaf-like, calyx glabrous with crested lobes, corolla yellow tube very slender 4–6 times as long as the calyx, upper lobe erect inflated with a slender deflexed flexuous beak. *Benth. in DC. Prodr.* x. 565. P. tubiformis, *Klotzsch in Reise Pr. Waldem. Bot.* 106, t. 57.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Central Asia, Siberia, Dahuria.

Rootstock apparently perennial. *Stems* 3–6 in., erect or ascending, stout, often branched. *Leaves* 1–3 by $\frac{1}{4}$–$\frac{1}{2}$ in., lobes or segments numerous; petiole $\frac{1}{2}$–1 in., stout. *Racemes* subcapitate; bracts longer than the calyx; flowers 1$\frac{1}{2}$–2$\frac{1}{2}$ in. long; pedicels of the axillary flowers sometimes $\frac{3}{4}$ in. *Calyx* $\frac{1}{3}$ in., lobes large. *Corolla* bright yellow with dark spots on the lower lip; tube slender, sometimes 2 in. long; lower lip $\frac{1}{2}$–$\frac{3}{4}$ in. broad. *Capsule* $\frac{2}{3}$–$\frac{3}{4}$ in. long, obliquely oblong-lanceolate, acute, $\frac{1}{3}$ or $\frac{1}{5}$ exserted. *Seeds* minute, $\frac{1}{24}$ in. long, narrow, with a basal appendage, black, very obscurely striated.—Habit and long tube of short specimens of *P. siphonantha*, but with a very differently coloured corolla and inflated upper lip.

28. **P. microcalyx**, *Hook. f.*; glabrous below, puberulous above, stem simple 1–2-leaved, leaves long-petioled linear pinnatifid lobes oblong obtuse crenate, flowers few subcapitate, calyx very small teeth crested, corolla-tube 3–4 times as long as the calyx purple upper lip inflated sickle-shaped beak nearly straight decurved. Pedicularis n. 25, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM HIMALAYA; Lachen and Samdong, alt. 12–15,000 ft., *J. D. H.*

Stem 4–6 in., solitary, rather slender and flexuous. *Radical* and cauline leaves few, 1–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., petiole as long as the blade. *Flowers* 5–6 in a head, subsessile, with occasionally an axillary pedicelled one below the head; bracts longer than the calyx, pinnatifid. *Calyx* $\frac{1}{6}$ in. long, cupular, membranous, 4-nerved, 4-cleft for $\frac{1}{3}$ way down, teeth with crested tips. *Corolla* dingy-purple, tube $\frac{1}{3}$ in. or less, upper lip as long as the lower which is $\frac{1}{2}$ in. broad with 3 rounded ciliate lobes, the middle the smallest. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. long, oblong, acute or acuminate, nearly straight, 3–4 times longer than the calyx. *Seeds* $\frac{1}{10}$ in. long, oblong, pale, striate and punctate.—The very small calyx well characterizes this species.

29. **P. asplenifolia,** *Floerke; Willd. Sp. Pl.* iii. 208; nearly glabrous or pubescent, stem 3–6 in., few-leaved, leaves all long-petioled linear obtuse pinnatifid or pinnatisect, lobes close-set crenulate, racemes short few-fld., bracts pinnatifid, calyx large glabrous lobes crested, corolla-tube twice as long as the calyx or less, upper lip large sickle-shaped erect, then inflated with a short acute straight or decurved beak. *Benth. in DC. Prodr.* x. 578; *Reichb. Ic. Fl. Germ.* t. 1743. P. Portenschlagii, *Saut. in Reichb. Iconogr.* v. 1, t. 401. P. asplenifolia, *Wall. Cat.* 416. P. Wallichii, *Bunge in Walp. Rep.* iii. 415.

ALPINE HIMALAYA; Nepal, *Wallich*; Sikkim, Samdong and Tunkra Pass, alt. 14–15,000 ft., *J. D. H.*—DISTRIB. Alps of Central Europe.

Rootstock apparently perennial. *Stems* subsolitary or many from the root, simple, 2–4 in. *Leaves* 1–$2\frac{1}{2}$ by $\frac{1}{4}$ in.; petiole slender, as long as the blade. *Racemes* 3–8-fld.; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in.; flowers $1\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in., membranous, lobes short all crested. *Corolla* dingy-purple; tube dilated at the mouth; upper lip $\frac{1}{2}$ in. high, lower $\frac{2}{3}$ in. broad, 3-lobed, mid-lobe very small, lateral large rounded. *Capsule* $\frac{3}{4}$ in. long, obliquely lanceolate, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{12}$ in., elliptic, base appendaged, obscurely striate, dark.

VAR. *albiflora*; densely tufted, flowers white.—Sikkim; at Kankola, alt. 13,000 ft., *J. D. H.*

? VAR. *pubescens*; densely tufted, pubescent or sparsely villous all over, lower peduncles sometimes radical and $1\frac{1}{4}$ in., flowers larger, corolla-tube sometimes 1 in. long, and lower lip 1 in. diam., capsules $\frac{1}{2}$–1 in. Pedicularis n. 20, *Herb. Ind. Or. H. f. & T.*—Sikkim, alt. 14–17,000 ft., *J. D. H.*

b. *Stem long slender flexuous or flaccid leafy; radical leaves evanescent.*

30. **P. flagellaris,** *Benth in DC. Prodr.* x. 581; softly hairy, stems slender diffuse flexuous leafy, leaves alternate very small shortly petioled ovate or oblong-ovate pinnatisect, segments crenate or toothed, flowers few axillary and subracemose, calyx-lobes crested, corolla pink tube 2–3 times as long as the calyx, upper lip forming a semicircular beaked horn tumid in the middle, lower broadly 3-lobed.

UPPER ASSAM, *Griffith.* SIKKIM HIMALAYA; Lachoong, alt. 10–11,000 ft., *J. D. H.*

Stems prostrate and ascending, 8–18 in. long, simple or sparingly branched, naked below. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in.; petiole short, slender; pinnules 3–6 pair, rather recurved, lower sometimes petiolulate. *Racemes* very short; bracts pinnatifid, longer than the calyx. *Calyx* rather narrowly oblong. *Corolla-tube* rather broad or slender; upper lip gradually narrowed to the base and to the acute tip, lower lip about $\frac{1}{2}$ in. diam. *Capsule* (unripe) lanceolate, acuminate, $\frac{1}{3}$ longer than the calyx.

31. **P. furfuracea,** *Wall. Cat.* 412; nearly glabrous throughout, stems flaccid branched sparingly leafy, leaves alternate long-petioled broadly ovate oblong or rounded lobulate or subpinnatifid lobes irregularly toothed, flowers axillary and in lax leafy racemes, calyx-lobes very small, corolla pale pink tube short, upper lip arched beaked. *Benth. Scroph. Ind.* 54, and in *DC. Prodr.* x. 580.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich;* Sikkim, margins of woods, alt. 8–12,000 ft., *J. D. H.*, &c.

Perennial? *Stems* 1–2 ft., as thick as a crow-quill, flexuous succulent, with one or two lines of pubescence above. *Leaves* 1–3 by 1–2$\frac{1}{2}$ in., membranous, sometimes pinnatisect at the base, glabrous on both surfaces, nearly white with finely reticulated venules beneath; petiole very slender, 1–3 in. *Flowers* scarcely racemose, $\frac{3}{4}$ in. long; bracts leaf-like; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in., very slender. *Calyx* $\frac{1}{4}$ in. long, tubular, split on one side. *Corolla* very pale pink, lower lip about $\frac{1}{2}$ in. broad. *Capsule* $\frac{1}{2}$ in. long, ovate-lanceolate, nearly straight, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{16}$ in. long, ellipsoid, acute, most minutely reticulate, black.

7203 VAR. *integrifolia;* leaves broadly ovate or rounded irregularly toothed or lobulate, calyx villous, corolla red-purple. Pedicularis n. 30, *Herb. Ind. Or. H.f. & T.*—Sikkim, alt. 9–10,000 ft., *J. D. H.*

? 32. **P. curvipes,** *Hook. f.*; quite glabrous, stem very slender long flexuous branched branches long curved, leaves scattered small petioled oblong pinnatifid lobes few incised, flowers axillary, long pedicelled, pedicels recurved in fruit, capsules pendulous.

SIKKIM HIMALAYA; Tumbok, alt. 10,000 ft., *Clarke.*

Stems a foot long, as thick as a sparrow's quill, curving. *Leaves* far apart, $\frac{1}{2}$–1 by $\frac{1}{4}$–1 in., flaccid, lobes 3–4 pair, rather distant; petiole as long as the blade. *Calyx* $\frac{1}{6}$ in. long, mouth oblique, lobes short crenate. *Capsule* $\frac{1}{3}$ in. long, oblong, acute, slightly oblique, half exserted, shorter than the decurved slender pedicel. *Seeds* $\frac{1}{8}$ in. long, slender, acute at both ends, obscurely striate, pale.—A remarkable species.

33. **P. fissa,** Turcz.?; *Benth. in DC. Prodr.* x. 571; stem stout simple leafy pubescent or glabrate, leaves all petioled lanceolate bipinnatisect segments small cartilaginous toothed, spikes dense-fld. villous, bracts long leaf-like lanceolate crenate, calyx-teeth broad obtuse entire, corolla-tube longer than the calyx, upper lip linear-oblong incurved acutely 2-fid hardly beaked, lower glabrous.

N. KASHMIR; Dras, alt. 10–11,000 ft., *Henderson.*—DISTRIB. Altai, Dahuria.

Stem (in the solitary Indian specimen) 8 in., stout, strict. *Radical leaves* 4–5 in., puberulous beneath; petiole very slender, as long as the blade; cauline similar. *Spike* 2 in. long; lower bracts pinnatisect, middle ones 3-fid; lobes lanceolate, crenate, longer than the calyx; flower 1 in. long. *Calyx* $\frac{1}{2}$ in., ventricose, woolly, nerves strong; teeth lanceolate, entire. *Corolla* quite glabrous; upper lip $\frac{2}{3}$ in. long, tip rounded in front; lower shorter broadly 3-lobed. *Filaments* glabrous.—This closely resembles several other species of the *comosa* group, which, with *P. fissa,* may ultimately prove forms of *P. comosa,* Linn., itself, as may *P. lasiostachys,* Bunge, *rubens,* Steph., and *venusta,* Schangin. From the typical *P. comosa* it differs in the villous calyx, glabrous filaments, and in the lower lip not being ciliate (the latter of which characters seems often wanting in Siberian specimens of *comosa*).

** Upper lip of the corolla rounded at the tip, not beaked.

34. **P. versicolor,** *Wahlb.*; *Steven Monogr. Pedic.* 52; hirsute above, stem short, leaves chiefly radical all petioled linear pinnatifid or pinnatisect, lobes short oblong obtuse crenate, racemes oblong dense-fld., bracts pinnatifid,

calyx-lobes entire or toothed, corolla lemon-yellow upper lip erect linear-oblong slightly incurved longer than the lower. *Benth. in DC. Prodr.* x. 578; *Reichb. Iconogr.* t. 14; *Royle Ill.* t. 72, f. 2.

ALPINE HIMALAYA; from Kashmir, alt. 9–13,000 ft., to Sikkim, alt. 14–15,000 ft. —DISTRIB. Mts. of Central Europe, Arctic Europe, Asia and America.

Rootstock stout, perennial? *Stem* usually solitary, 1–4 in., erect, with 1–2 leaves, rather stout. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., glabrous, lobes or segments many; petiole stout or slender, shorter than the blade. *Racemes* 1–$2\frac{1}{2}$ in.; flowers erect, 1–$1\frac{1}{2}$ in. long; bracts often longer than the calyx. *Calyx* $\frac{1}{3}$ in. long. *Corolla* yellow with the upper lip often pink or red, tube twice as long as the calyx; upper lip $\frac{1}{3}$ in., compressed, tip rounded; lower shorter, 3-lobed, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., deflexed. *Capsule* not seen in Indian specimens.

35. **P. polygaloides,** *Hook. f.*; dwarf. branched from the base, sparsely hairy, leaves few alternate very small petioled oblong pinnatifid lobes short crenate or toothed, flowers axillary pedicelled, calyx-lobes crested, corolla pink tube not exceeding the calyx, upper lip erect straight linear-oblong tip truncate inner angle acute lobes of lower divaricate. Pedicularis n. 9, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM HIMALAYA; at Yeumtong, alt. 14,000 ft., *J. D. H.*

Annual, whole plant 1–$1\frac{1}{2}$ in. high; branches rather slender. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., lobes not numerous; petiole short. *Flowers* scattered, $\frac{1}{2}$ in. long; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in. *Corolla* pink, upper lip as long as the lower, the lateral lobes of which spread at right angles. *Capsule* $\frac{1}{3}$ in. long, oblong, obliquely acute. *Seeds* $\frac{1}{16}$ in., ellipsoid, dark, minutely striate and punctulate.

36. **P. Perrottetii,** *Benth. in DC. Prodr.* x. 565; annual, sparsely pubescent, stems flexuous leafy, leaves alternate petioled oblong pinnatifid, lobes oblong subrecurved obtuse crenate, flowers few axillary white, corolla-tube 3–4 in., throat shortly funnel-shaped, upper lip oblong straight much shorter than the lower, tip rounded, *Wight Ic.* t. 1418.

NILGHERRY HILLS; *Perrottet, Wight*, &c.

Stems 5–10 in., rigid but wavy, naked below, rarely branched, sparsely hairy. *Leaves* numerous, $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, segments with incurved margins, hairy on both surfaces. *Flowers* subsessile. *Calyx* 1 in. long, tubular, lobes crested. *Corolla-tube* $\frac{1}{4}$ in. diam.; limb $1\frac{1}{2}$ in. diam., cup-shaped. *Capsule* not seen.

37. **P. zeylanica,** *Benth. Scroph. Ind.* 54, and in *DC. Prodr.* x. 580; hoary-pubescent or glabrate, stem tall erect leafy, leaves sessile or petioled linear-oblong or oblong margin lobulate or subpinnatifid lobes rounded crenulate, racemes short or long, bracts pinnatifid, calyx short, teeth crested, corolla-tube hardly exserted, upper lip linear-oblong incurved tip rounded. *Wight Ic.* t. 1419.

DECCAN PENINSULA; Mts. of the Concan, *Stocks*; Nilgherry and Pulney Hills, *Wight*, &c. CEYLON; higher parts of the Central Province, abundant.

Annual, 6–18 in. high. *Stem* stout, simple or branched. *Leaves* 1–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., sometimes contracted into a short petiole. *Racemes* usually elongate, few- or many- and dense- or lax-fld., much elongate in fruit; pedicels short; bracts longer than the calyx; flowers $\frac{1}{2}$–1 in. long. *Calyx* $\frac{1}{2}$ in. long, cleft to near the base. *Corolla* pink; tube broad; upper lip shorter than the lower which is $\frac{1}{3}$–$\frac{2}{3}$ in. diam. with 3 broadly rounded lobes. *Capsule* $\frac{1}{3}$–$\frac{3}{8}$ in. long, obliquely ovate-lanceolate, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{30}$ in. long, broadly ellipsoid or irregular, dark, punctulate.—Habit and foliage of *P. carnosa*.

53. LATHRÆA, *Linn.*

Leafless low perennial fleshy white or purplish herbs, black when dry, with

a scaly buried rootstock and short erect scaly stems. *Flowers* biseriate in a secund raceme, bracteate, ebracteolate. *Calyx* campanulate, entire or split in front, 4-fid or -lobed, lobes valvate. *Corolla-tube* arched or nearly straight; lips erect, upper arched entire or notched; lower smaller, truncate, 3-toothed, plaited. *Stamens* 4, anthers under the upper lip; cells equal, parallel, margins bearded, bases mucronate. *Disk* glandular, enlarged, opposite the lower lip. *Ovary* 1-celled; placentas 2, 2-fid; style exserted, decurved, stigma capitate. *Capsule* 2-valved. *Seeds* many, small, globose, rugose.—Species 3, Europe, N. Asia, Himalaya.

1. **L. squamaria**, *Linn.*; *Boiss. Fl. Orient.* iv. 493; calyx split to the base in front. *Reuter in DC. Prodr.* xi. 40; *Reichb. Ic. Fl. Germ.* t. 1764.

WESTERN HIMALAYA, *Falconer.* KASHMIR, Banahal, alt. 6000 ft., *Thomson*; Urrukta, *Royle.*—DISTRIB. Europe, Siberia.

Rootstock stout, fleshy, branched. *Stems* 4–10 in., stout scaly. *Raceme* 4–6 in., bracts like the scales, broadly oblong. *Flowers* ½ in. long. *Calyx* 2-lipped, 4-toothed to the middle, teeth subacute. *Corolla* longer than the calyx, arched, lobes short erect, anthers cohering. *Capsule* ovoid.

54. MELAMPYRUM, *Linn.*

Annual erect herbs, black or dark when dry. *Leaves* opposite, narrow, entire or incised at the base. *Flowers* axillary or secund in dense spikes with large often coloured bracts, ebracteolate. *Calyx* tubular, 5-toothed, upper teeth often larger. *Corolla* 2-lipped, tube cylindric; upper lip erect, short, hooded, compressed, margins reflexed or with a tooth on each side; lower longer, erecto-patent, 3-lobed, base 2-gibbous. *Stamens* 4, ascending; anthers under the upper lip, meeting in pairs, cells distinct equal parallel, bases obtuse. *Stigma* simple; ovules 2 in each cell, one sessile the other stipitate. *Capsule* compressed, ovate, oblique, loculicidal. *Seeds* 4 or fewer, funicle swollen.—Species 6, of N. temp. regions.

1. **M. indicum,** *Hook. f. & T. in Hook. Kew Journ. Bot.* ix. 246, t. viii.; slender, scaberulous, leaves petioled lanceolate or ovate-lanceolate, bracts leaf-like scaberulous, racemes lax-fld., flowers puberulous, calyx-teeth equalling the tube, corolla-tube much longer than the calyx slender.

KHASIA MTS., alt. 5–6000 ft., *Lobb, J. D. H. & T. T.*

A slender twiggy branched herb, 2 ft. high. *Leaves* ¾–1 in., acute, quite entire, petiole ⅛ in. *Flowers* subsessile, ¾ in. long, dark red. *Calyx* $\frac{1}{6}$ in., lobes subacute rather shorter than the tube. *Corolla* puberulous, upper lip almost truncate shorter than the 3-fid lower. *Filaments* puberulous. *Capsule* ovoid, beaked, cells 1-seeded.

GENERA OF DOUBTFUL POSITION.

55. OREOSOLEN, *Hook. f.*

A small, tufted, glabrous, rather fleshy herb. *Stem* short, stout. *Leaves* opposite, subsessile, oblong-obovate, obtuse, coarsely irregularly crenate-serrate, nerves subparallel, midrib obscure. *Flowers* fascicled in the leaf-axils, shortly pedicelled, bracteate, ebracteolate. *Sepals* 4, linear, obtuse, erect, puberulous. *Corolla* straight, tube twice as long as the sepals, tubular-funnel-shaped, mouth dilated, limb short, 2-lipped; lips subequal, upper of two round lobes (the outer in bud); lower 3-lobed, lobes short 2 lateral retuse, median smaller ovate obtuse. *Stamens* 4, inserted in the middle of the tube, filaments erect thickened above, glabrous; anthers small, adnate

to the thickened top of the filament, rounded, 1-celled, included in the tube; staminode subulate, on the upper lip. *Ovary* small, ovate, compressed, style long slender, stigma capitellate.

1. **O. Wattii,** *Hook. f. in Hook. Ic. Pl. ined.*

SIKKIM HIMALAYA; Jongri, alt. 14,000 ft., *Watt.*

Stem about 1 in. long as thick as a crow-quill, sheathed by a pair of reduced leaves. *Leaves* 1 in. long, quite glabrous, black when dry with translucent nerves which run straight from and through the broad petiole and unite anastomosing near the top and sides of the leaf. *Flowers* $\frac{3}{4}$ in. long.—Probably belongs to the tribe *Veroniceæ.* The specimens are very imperfect and difficult of analysis, owing to their apparently fleshy texture.

56. **FALCONERIA,** *Hook. f.*

A small scabigerous laxly hairy herb, with the habit of a *Mazus.* *Leaves* radical, petioled, obovate or oblong, crenate. *Flowers* racemed, bracteate, ebracteolate. *Sepals* 5, subequal, linear-obovate. *Corolla* 2-labiate, tube short, decurved, upper lip 2-lobed, lower larger 3-lobed, one lateral lobe exterior. *Stamens* 2, included, filaments straight; anthers 2-celled; cells diverging, free below, united at the top. *Ovary* ellipsoid; style short, stigma capitellate.

1. **F. himalaica,** *Hook. f. in Hook. Ic. Pl.* t. 1438.

WESTERN HIMALAYA; Kumaon, *Falconer*; Madhari Pass, alt. 8000 ft., *Strachey & Winterbottom* (Mazus, No. 4).

Rootstock short with thick fleshy fibres. *Leaves* 3–5 in., more or less pubescent on both surfaces, tip rounded, base crenate; petiole broad, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, winged above. *Scape* stout or slender, longer or shorter than the leaves, leafless, laxly hairy, as is the short loose raceme; bracts small, obovate-oblong or spathulate; pedicels short. *Sepals* $\frac{1}{10}$ in. long. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. long; tube broadly funnel-shaped, suddenly decurved above the base; lower lip twice as long as the upper, lobes obovate retuse. *Style* included.—Apparently near *Wulfenia*, but differing in the 2-lipped corolla and included stamens. I have named it after the late Dr. Hugh Falconer, F.R.S., Superintendent of the Botanical Garden of Saharumpore and afterwards of Calcutta, to whom *Falconeria*, Royle, now included under *Sapium*, was dedicated.

ORDER CIV. **OROBANCHACEÆ.** (By J. D. Hooker.)

Leafless brown annual white or reddish root-parasites. *Stem* usually simple, stout or slender, scaly. *Flowers* solitary or in spikes or racemes, irregular. *Calyx* spathaceous, or of 4–5 free or connate sepals. *Corolla* hypogynous, tube curved; limb 2-lipped; upper lip arched, lower 3-fid, throat often with 2 villous folds. *Stamens* 4, didynamous, inserted on the corolla-tube; anthers 1–2-celled, cells spurred at the base opening by slits or basal pores, one often imperfect. *Disk* unilateral or glandular or 0. *Ovary* of 2 connate carpels, 1- rarely 2-celled; style long, tip curved, stigma capitate 2-lobed; ovules many, rarely few, anatropous on 2 (rarely more) pairs of free or confluent parietal placentas which sometimes meet in the centre of the ovary. *Capsule* 1-celled, 2-valved, few- or many-seeded. *Seeds* minute, testa pitted or tubercled rarely lax and reticulated, albumen fleshy; embryo ovoid, undivided or 2-fid.—DISTRIB. Genera 11, species about 150, temperate and tropical.

I have removed *Lathræa* from this Order to *Scrophularineæ* (p. 317), and taken *Campbellia* from the latter, uniting it with *Christisonia.*

* *Corolla-lobes all broad, subequal, spreading.*

Calyx spathaceous. Anther-cells unequal . . . . 1. ÆGINETIA.
Calyx tubular. Anther-cells unequal . . . . 2. CHRISTISONIA.
Calyx campanulate. Anther-cells equal . . . . 3. CISTANCHE.

** *Corolla 2-lipped.*

Upper lip 2-lobed, lower 3-lobed . . . . 4. OROBANCHE.
Upper lip erect hooded subentire, lower very short . . . . . . 5. BOSCHNIACKIA.

1. ÆGINETIA, *Linn.*

Leafless herbs with branched or simple naked or scaly scapes or stems. *Flowers* few, large, solitary, or corymbose, ebracteolate. *Calyx* spathaceous, split in front nearly to the base. *Corolla-tube* broad, incurved; limb spreading, obscurely 2-lipped; lobes 5, broad, 2 upper connate. *Stamens* included; anthers with one cell perfect adnate to the filament not spurred at the base, the other cell absent in the upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the cavity, ovuliferous all over; style slender, stigma large peltate. *Capsule* sub-2-valved. *Seeds* crowded, minute, pitted.—Species 4–5, tropical Asiatic.

1. **Æ. indica,** *Roxb. Cor. Pl.* i. 63, t. 91, and *Fl. Ind.* iii. 30; scape very slender naked, corolla purple, placentas multifid. *Reuter in DC. Prodr.* xi. 43; *Wall. Cat.* 3964; *Benth. Scroph. Ind.* 55; *Wight Ill.* t. 158 b, f. 5, and *Ic.* t. 895; *Dalz. & Gibs. Bomb. Fl.* 202; *Griff. Ic. Pl. Asiat.* t. 423. Orobanche Æginetia, *Linn. Sp. Pl.* 883.

Throughout INDIA, from the Western Himalaya in Kumaon, ascending to 3500 ft., to Nepal, Assam and the Khasia Mts.; and southwards to Tenasserim, Travancore and CEYLON.—DISTRIB. Burma, China, Japan, Philippine Islands.

Root of fleshy interlaced fibres. *Scapes* solitary or several, 6–16 in. high, with a few scales near the base. *Flowers* solitary. *Calyx* ¾ to nearly 2 in. long, acute. *Corolla* 1–2 in., limb 1 in. diam. or less, margins fimbriate. *Anthers* of lower stamens with a thick gibbous obtuse spur behind. *Capsule* as large as a filbert. *Seeds* yellowish-white, testa hyaline lax.

2. **Æ. pedunculata,** *Wall. Pl. As. Rar.* iii. 13, t. 219; scape short stout very fleshy many-fld., flowers on long peduncles bracteate at the base, corolla-tube yellow mouth blue, placentas 2 each of 2 plates. *Reuter in DC. Prodr.* xi. 43; *Wight Ill.* t. 158 b, f. 6, and *Ic.* t. 1421. Æ. abbreviata, *Ham. in Wall. Cat.* 3965; *Benth. Scroph. Ind.* 95; *Reuter l. c.* Æ. acaulis, *Walp. Rep.* 481; *Reuter l. c.* Orobanche pedunculata, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 29. O. acaulis, *Roxb. Cor. Pl.* iii. 89, t. 292, and *Fl. Ind.* iii. 29.

Throughout INDIA, on the roots of grasses, from Murree, *Elliott*, Sikkim, *Clarke*, and Assam, to Travancore and Singapore.—DISTRIB. Cochin China, Java.

Whole plant 3–6 in. high, red or yellow. *Stem* very short, as thick as a swan's quill, buried in the soil, giving off numerous alternate pedicelled flowers that rise above the surface of the ground, rarely slender and 1-fld. *Peduncles* 1–4 in., slender to stout, bracteate at the base; bract ¼–½ in., ovate obtuse. *Calyx* 1½–2½ in. long, fleshy, red then yellow white, loaded with mucilage, tip obtuse, acute or shortly beaked. *Corolla-tube* as long as the calyx, yellowish, limb bright violet, lobes crenate and erose. *Anthers* of lower stamens with a large dorsal fleshy decurved horn. *Stigma* broadly cordiform, peltate. *Capsule* ovoid. *Seeds* brown.—Wight's figures represent the placentas as more divided than other analyses show.

2. **CHRISTISONIA,** *Gardn.*

Fleshy, low, scaly, parasitic herbs, with white yellow purple or rose-coloured flowers; stems simple or tufted from a short or long rootstock. *Scales* alternate, obtuse or acute. *Flowers* bracteolate or not. *Calyx* tubular, terete or angular, 5-toothed or -lobed. *Corolla-tube* long, inflated, or funnel-shaped, slightly curved, obscurely 2-lipped, 5-lobed; lobes subequal, rounded, 2 upper (inner in bud) suberect, lower spreading. *Stamens* 4, included or subexserted, filaments stout; anther with one perfect cell and one imperfect which is spurred or appendaged, rarely with both cells perfect. *Disc* 0. *Ovary* 1-celled, with 2 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large 2-lobed upper lobe very small lower very large orbicular or clavate; ovules numerous. *Capsule* ovoid or subglobose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—DISTRIB. Species 10, all tropical Asiatic.

There is no character by which *Campbellia* can be separated from *Christisonia*, that of the placentas meeting or not in the axis being one of degree and not accompanied by any other. I find it impossible to determine the species from dried specimens, and have been compelled to resort for their limitation to the descriptions and published figures of Gardner and Wight, and to the fine series of drawings of native specimens in the Kew Herbarium. I have also availed myself of some valuable notes made by Mr. Clarke, who attempted the definition of the species when studying the Indian *Cyrtandraceæ.*

1. **C. tubulosa,** *Benth. in Gen. Pl.* ii. 982; quite glabrous, stems tall flexuous, scales very few distant acute, flowers racemose, pedicels slender ebracteolate, calyx angular, lobes acute, anther-spurs acute, ovary 1-celled, placentas ovuliferous all over. Oligopholis tubulosa, *Wight Ic.* t. 1422, and *Ill.* t. 158 b, f. 7.

SOUTH DECCAN; Kurg and Courtallam, *Wight.*

Stem 6–10 in., simple or divided below. *Pedicels* stout, 1–4 in.; bracts obtuse. *Calyx* $\frac{2}{3}$–$1\frac{3}{4}$ in., lobes triangular. *Corolla* 1–$2\frac{1}{2}$ in. long, mouth $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., blue?, pubescent without in Wight's figure, glabrous in specimens; lobes rounded, quite entire. *Filaments* pubescent. *Stigma* orbicular; "placentas nearly meeting in the centre, ovuliferous on their opposed faces, confluent below" (*Clarke*).

2. **C. subacaulis,** *Gardn. in Calc. Journ. Nat. Hist.* viii. 162; quite glabrous, almost stemless, scales large acuminate, flowers crowded, pedicels longer than the bracts ebracteolate, calyx-lobes acuminate, corolla-lobes edged with violet, cells of shorter stamens both perfect. *Wight Ic.* t. 1423 (*corrections in text*). Campbellia subacaulis, *Benth. in Gen. Pl.* ii. 967. Æginetia acaulis, *Walp. Rep.* iii. 481. *Æ.* acaulis, var. β *Thw. Enum.* 221. Phelipæa subacaulis, *Benth. Scroph. Ind.* 55; *Reuter in DC. Prodr.* xi. 11.

NILGHERRY MTS. and Courtallam, *Wight.* CEYLON; Rambodde district.

Wight's figure represents a plant 4 in. high, with a very short stout stem, clothed with scales $1\frac{1}{2}$ in. long, and a corolla 2 in. long. A drawing sent by Thwaites (in Herb. Kew) is indefinite as to the bracts and calyx, and has a white corolla with an inflated white tube $1\frac{1}{2}$ in. long, and limb as broad edged with violet.—*Filaments* glabrous. *Ovary* 1-celled; placentas nearly meeting in the centre, opposed faces not ovuliferous; larger stigmatic lobe orbicular.

3. **C. Hookeri,** *Clarke mss.*; almost stemless, quite glabrous, scales truncate lacerate, pedicels very short ebracteolate, calyx terete, lobes rounded,

upper anthers 1-celled simple, lower with a greatly thickened connective produced behind into a terete appendage rounded at the tip.

SIKKIM HIMALAYA, in low valleys, and KHASIA MTS., alt. 2–4000 ft., *J. D. H. & T. T.*

Whole plant 3–4 in. high. *Stem* very stout, covered with brown scales ½ in. long with ragged edges. *Flowers* sessile. *Calyx* 1 in., pale violet with red-brown lobes. *Corolla* 2–2½ in. long, inclined; tube white, inflated, throat contracted; limb ¾ in. diam., pale violet. *Stamens* included, glabrous; connective of lower anthers white, much longer than the purple cell. *Ovary* 1-celled; placentas 2-partite, the divisions cordate in section, covered all over with ovules; larger stigmatic lobe orbicular.—Described from a drawing made my me in Sikkim.

4. **C. Lawii,** *Wight Ic.* t. 1427; quite glabrous except the corolla, rootstock short tuberous lobed, stems short, scales imbricate, pedicels very short ebracteolate, calyx-lobes acute, corolla pale purple with yellow spots pubescent without and within, anthers acutely spurred, ovary 1-celled, placentas 2-fid. *Dalz. & Gibs. Bomb. Fl.* 202. Campbellia Lawii, *Benth. in Gen. Pl.* ii. 967.

The CONCAN; Tanna, *Law, Ritchie*; Salsette and between Ram Ghat and Belgaum, *Dalz. & Gibs.*

Stems 1–3 in., very stout, thickened upwards, clothed with scales. *Calyx* ½ in., tubular, dark brown. *Corolla* 2 in., tubular; tube dull white limb blueish-purple, yellow within; upper lobes erect, lower horizontal shorter. *Filaments* with minute crisped pubescence, white; anthers pale, posterior cells all fertile, apex subulate with a pore; anterior cell subulate, like an inverted comma. *Stigma* of 2 capitate lobes.—Description chiefly from notes by Dr. Ritchie, who remarks that the figures of the capsule and stigma given by Wight are erroneous, the placenta though approaching being quite free with revolute lobes.

5. **C. calcarata,** *Wight Ic.* t. 1426; glabrous except the corolla, stem elongate, scales ovate obtuse, flowers racemose long-pedicelled ebracteolate, calyx-lobes subacute, corolla blueish-white, tube hairy, anthers 2-celled, one cell barren spurred. C. Stocksii, *Hook. Ic. Pl.* t. 836; *Dalz. & Gibs. Bomb. Fl.* 202.

The CONCAN; Tanna and Salsette, *Law, Dalzell*, &c., parasitic on the roots of *Strobilanthes*.

Probably a more fully developed state of *C. Lawii*.

6. **C. bicolor,** *Gardn. in Calc. Journ. Nat. Hist.* viii. 159; hairy, stem very short, scales ovate acute or subacute, flowers racemose, pedicels long or short 2-bracteolate at the base, calyx-teeth acute, corolla funnel-shaped pale rose or yellow. *Thwaites Enum.* 222. C. pallida, *Gardn. l. c.* 160. Christisonia aurantiaca, *Wight Ic.* t. 1486.

NILGHERRY HILLS; at Neddawattum, *Wight*, &c. CEYLON; Central Province, alt. 3–4000 ft., *Gardner*, &c.

Stem red-brown, scaly, continuous with a cylindric warted rhizoma as thick as a crow-quill and several inches long. *Scales* ⅓ in. long, red-brown. *Pedicels* ⅓ in. *Calyx* orange-brown, about 1 in., terete. *Corolla* 1½–2 in.; tube pale straw-coloured in Wight's and Thwaites' drawings, limb the same or white. *Stamens* included, filaments pubescent; anthers with the barren cell acutely spurred. *Placentas* in Wight's figure (of *aurantiaca*) 2-partite, nearly meeting in the centre, with the opposed faces not ovuliferous.—Thwaites' *B. pallidiflora* (C. pallida, *Gardn.*) differs according to his drawing only in the paler corolla-lobes.

7. **C. neilgherrica,** *Gardn. in Calc. Journ. Nat. Hist.* viii. 157; quite glabrous except sometimes the corolla, stem short very stout, scales

densely imbricated below obtuse, flowers densely racemose yellow, pedicels 2-bracteolate, calyx 2-lipped 5-angled, lobes broad obtuse, filaments glabrous, anthers ovoid acute 1-celled, larger stigmatic lobe clavate. ? C. unicolor, *Gardn. l. c.* 161; *Thwaites Enum.* 222. Campbellia cytinoides, *Wight Ic.* t. 1425; *Thwaites l. c.* 427. ? C. aurantiaca, *Wight Ic.* t. 1424. Phelipæa? cytinoides, *Reuter in DC. Prodr.* xi. 14.

NILGHERRY MTS.; *Strobilanthi* in woods at Pycarrah, Neddawattum, &c., *Wight.* CEYLON; Rambodde, alt. 3–4000 ft., Hunasgiria range, and Pedrotatagalla, alt. 7000 ft., *Thwaites*, &c.

Whole plant yellow. *Stem* 3–6 in. long, thick, obtusely angled. *Scales* $\frac{1}{3}$ in. *Flowers* 8–12; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., angular, thick; bracteoles below the middle about $\frac{1}{2}$ in. long, acute, veined, toothed at the tip. *Calyx* $\frac{3}{4}$ in. long. *Corolla* 1$\frac{1}{4}$ in. long, funnel-shaped; lobes rounded, quite entire. *Placentas* in Wight's drawing of *Campb. cytinoides* nearly meeting in the axis of the ovary, the flat opposed faces without ovules.—Gardner described *C. unicolor* from a drawing of which I have seen no copy. Except in the subexserted anthers and obtusely 5-lobed calyx, I do not see how it differs by his description from *C. neilgherrica.* A drawing sent by Thwaites of the plant he refers to *C. unicolor* has acute calyx-teeth. In Wight's *Campb. aurantiaca* (referred here by Clarke) the corolla is represented as hairy on both surfaces, as are the filament and style; and the anthers are exserted ovate acute, and 2-celled. In his *Campb. cytinoides* the anthers are also exserted ovate and acute, but 1-celled. I find the corolla in Wight's specimens to be either perfectly glabrous or pubescent, and the anthers to be ovoid acute 1-celled.

8. **C. tricolor,** *Gardn. in Calc. Journ. Nat. Hist.* viii. 153; quite glabrous, stem slender few-fld., scales few ovate acute, calyx 5-angled narrow, lobes acute, corolla with the upper lip blood-red, lower rose-coloured, throat yellow, filaments glabrous. *Thwaites Enum.* 222.

CEYLON; Central Province, alt. 3–4000 ft., parasitical on *Acanthaceæ*, *Gardner*, &c.

Stems more slender than in any of the preceding, 2–4 in. high. *Scales* about $\frac{1}{2}$ in. *Calyx* $\frac{3}{4}$ in. long. *Corolla* 2$\frac{1}{2}$ in. long, lobes denticulate. *Stigma* with the large lobe orbicular. *Placentas* 2-partite, cordate in section, covered all over with ovules.—A coloured figure apparently of this species in Jerdon's collection of drawings represents the corolla as 3 in. long, with a violet upper lip, and pale rose lower one; the calyx pedicels and bracts are red-brown.

VAR. *grandiflora*; corolla larger pale rose-coloured. C. grandiflora, *Gardn. l. c.* 155; *Thwaites l. c.* 221.—Ceylon; Adam's Peak, alt. 5000 ft., *Gardner.* Gardner gives no other characters but greater size and a uniform rose colour of the flower, whereby to distinguish this from *C. tricolor*; for that of the sterile cell of the anther being ascending (and not deflexed) is, as Thwaites' (who suggests *grandiflora* being a variety), a fallacious one.

9. **C. albida,** *Thwaites mss.*; sparsely pubescent, stem very short, scales very obtuse, flowers crowded very shortly pedicelled, calyx 2-bracteolate, lobes rounded, filaments very short, anthers all unequally 2-celled, cells oblong parallel. Campbellia albida, *Benth. in Gen. Pl.* ii. 967.

CEYLON; near Hankalla, alt. 6000 ft., *Thwaites.*

Stem 1–2 in., from an elongate warted rhizoma like that of *C. bicolor*, very stout. *Scales* $\frac{1}{4}$ in., obovate, tip rounded. *Flowers* crowded, much smaller than in any of the other species. *Calyx* $\frac{1}{3}$ in. long, pubescent, lobes very short, erose. *Corolla* 1 in., pubescent externally. *Anther-cells* acute below. *Ovary* completely 2-celled; stigma very small, clavate.

3. CISTANCHE, *Hoffm. & Link.*

Scapigerous herbs, scape or stem simple scaly. *Flowers* in dense spikes, subsessile, 2-bracteolate, yellow violet or purple. *Calyx* broadly tubular-

campanulate; lobes 5, subequal, obtuse. *Corolla-tube* long, incurved, dilated above; limb spreading, oblique, lobes 5 broad, subequal. *Stamens* 4, subexserted; anthers subtransverse, often villous, cells equal parallel, bases obtuse. *Ovary* 1-celled; placentas 4, equidistant or in pairs; stigma broad. *Capsule* ovoid, laterally compressed, 2-valved to the base. *Seeds* numerous, subglobose, reticulately punctate.—Species 12, of the Mediterranean region and N. central and subtropical Asia.

C. tubulosa, *Wight Ic.* t. 1420, bis (C. lutea *in letterpress*); glabrous or pubescent, very stout, scales lanceolate, spike dense-fld., calyx-lobes obtuse, corolla-tube 2–3 times as long as the calyx, filaments hirsute below, anthers woolly not apiculate. C. lutea, *Wight Ill.* t. 158 b, f. 4. Phelipæa tubulosa, *Schrenk Plant. Æg. Arab. Spec.* 23; *Boiss. Fl. Orient.* iv. 500. P. calotropidis, *Walp. Rep.* iii. 462; *Reuter in DC. Prodr.* xi. 13. Orobanche calotropidis, *Edgew. in Hook. Journ. Bot.* ii. 285

PUNJAB and SCINDE.—DISTRIB. Central Asia and westwards to Arabia.

Stem 1–5 ft., often as thick as the wrist, unbranched. *Scales* $\frac{1}{2}$–1 in. *Spike* 6–10 in., sometimes 3 in. diam.; bracts lanceolate, longer than the calyx, bracteoles narrower and shorter, linear. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Corolla* 1–1$\frac{3}{4}$ in., yellow, much incurved, base slender, tube inflated; mouth $\frac{3}{4}$–1$\frac{1}{4}$ in. diam.; lobes short. *Anthers* subexserted, tip rounded or obscurely apiculate. *Placentas* 4, subequidistant.—I doubt this being specifically different from the common *C. lutea*, which extends to Spain and Morocco, for I find an obscure mucro on some of the anthers.

VAR. *tomentosa*; stem above bracts and calyx sparsely woolly.—Lahore, *Thomson.*

4. OROBANCHE, *Linn.*

Scapigerous herbs; scape or stem simple or branched, stout or slender, scales acute. *Flowers* in dense or lax or interrupted bracteate spikes or racemes, bracteoles 2 or 0. *Calyx* unequally 4-fid, or 2-partite from back to front, segments entire or 2-fid with rarely a 5th lobe or segment. *Corolla* broad or long, tube curved dilated above circumsciss at the base; limb 2-lipped; upper lip erect crenulate notched or 2-fid, lower more spreading 3-lobed. *Stamens* included; anther-cells equal, parallel, bases usually mucronate. *Disc* 0, or a gland. *Ovary* 1-celled; placentas 4, equidistant or in pairs; stigma funnel-shaped or peltate, more or less 2-lobed, lobes right and left. *Capsule* 2-valved, valves often cohering with the style. *Seeds* very numerous, globose.—Species about 100, chiefly in the northern and subtropical regions of the Old World.

SECT. I. **Osproleon,** *Wallr.* Bracteoles 0.

* *Calyx divided to the base posteriorly, entire anteriorly, equally 5-toothed.*

1. **O. kashmirica,** *Clarke mss.*; pubescent, stem simple, scales lanceolate, bracts lanceolate longer than the short broadly acutely toothed calyx, corolla pale brown short pubescent, filaments inserted at the base of the corolla pubescent below, anthers minutely hairy.

KASHMIR; at Tilail, alt. 11,000 ft., *Clarke.*

Pale brown, a foot high, stem as thick as a swan's quill or less. *Scales* $\frac{1}{4}$–$\frac{1}{2}$ in., few and distant. *Spikes* few and lax-fld.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* $\frac{1}{4}$ in. *Corolla* $\frac{1}{3}$–$\frac{2}{3}$ in., softly pubescent; tube broad, lobes rounded. *Anthers* small, included.

** *Calyx divided to the base posteriorly and nearly so anteriorly, segments 2-toothed or -lobed.*

2. **O. cernua,** *Loefl.*; *Boiss. Fl. Orient.* iv. 514; puberulous or glabrate, spikes dense, flowers blue, bracts lanceolate shorter than the corolla nerves strong parallel, calyx half as long as the corolla, segments 2-fid to the middle, lobes lanceolate, corolla ½ in. glabrous curved lobes crenate not ciliate, filaments glabrous, anthers nearly so. *Reuter in DC. Prodr.* xi. 32; *Reichb. Ic. Fl. Germ.* t. 1808. O. indica, *Wall. Cat.* 3966, *not of Roxb.*; *Benth. Scroph. Ind.* 55, *partly.*

WESTERN HIMALAYA; from Nepal to Kashmir and WESTERN TIBET, alt. 10–12,000 ft. OUDH and PATNA to the Punjab; the DECCAN from the Concan southwards.—DISTRIB. Westwards to N. Africa and Spain; extra-tropical Australia.

Stem stout, 6–12 in., pale brown or blueish. *Scales* ovate, upper acute or acuminate. *Spikes* often half as long as the stem or longer. *Sepals* with long points. *Corolla* ½–¾ in. long, sometimes puberulous above; 2 upper lobes broad, 3 lower ovate acuminate. *Anther-cells* acuminate. *Style* glabrous, stigmatic lobes short thick.—The anthers are sometimes a little hairy.

3. **O. Hansii,** *Kerner Nov. Pl. Sp.* ii. 15; pubescent, spikes dense, flowers blue, bracts ovate shorter than the corolla, nerves strong parallel, calyx half as long as the corolla, segments 2-fid to the middle, lobes lanceolate, corolla 1 in., nearly straight and glabrous, lobes crenate not ciliate, filaments glabrous, anthers hairy. ? O. fœtida, *Klotzsch in Reise Pr. Walden.* 111, *not of Desfontaines.*

WESTERN TIBET; Karakoram, alt. 8–12,000 ft., *Clarke.* LAHUL, *Jaeschke.*

This looks like a stout large-flowered var. of *O. cernua,* with deeper blue flowers broader bracts, and more hairy anthers.

4. **O. borealis,** *Turcz. in Bull. Soc. Imp. Nat. Hist. Mosc.* 1842, 420; furfuraceously pubescent, stem stout simple, scales few, spikes rather short dense-fld., bracts ovate-lanceolate equalling or exceeding the flower, calyx half as long as the corolla-tube or less with 4 subulate long and a median very small tooth, corolla pubescent tube broad curved lobes crenate blue, filaments and anthers glabrous. *Ledeb. Fl. Ross.* iii. 321; *Reuter in DC. Prodr.* xi. 32.

WESTERN HIMALAYA, from Murree to Kishtwar, alt. 7–8000 ft., *Thomson, Fleming,* &c. WESTERN TIBET; Karakoram, alt. 13,000 ft., *Clarke.*—DISTRIB. Central Asia.

Stem 6–10 in., rarely more, as thick as a goose-quill. *Scales* ¼–⅝ in., oblong- or ovate-lanceolate. *Spike* 2–4 in. *Corolla* ½ in.—This is certainly the plant of Turczaninov and Ledebour, which Boissier refers to *Phelipæa lanuginosa,* C. A. Meyer.

5. **O. Solmsii,** *Clarke mss.*; very robust, pubescent, bracts usually longer than the flowers lanceolate, calyx half as long as the corolla, segments bifid to the middle, lobes lanceolate, corolla ½–¾ in. long yellow puberulous, filaments and anthers glabrous. ? O. Galii, *Klotzsch in Reise Pr. Wald. Bot.* 111, *not of Dalz.*

WESTERN HIMALAYA; Kumaon at Tola, alt. 11,500 ft., *Strach. & Winterb.*; Kashmir and Kishtwar, alt. 8-11,000 ft., *Falconer,* &c.

Stem 12-18 in., often as thick as the thumb. *Scales* ½–1 in., lanceolate. *Spike* 6–10 in., dense-fld.; bracts very variable, narrow. *Corolla* curved, lobes crenulate.—Differs in the yellow flowers from *O. borealis.*

**** Calyx divided to the base anteriorly and posteriorly, the segments undivided.*

6. **O. epithymum,** *DC.*; *Boiss. Fl. Orient.* iv. 509; glandular-

pubescent, rather slender, spike short lax-fld., bracts about equalling the corolla, calyx-segments ovate-lanceolate 3-nerved entire equalling the corolla-tube, corolla ⅝ in. long pubescent orange-brown, lobes toothed or crenate not ciliate, filaments glabrous except at the base, anthers sparsely pubescent or glabrous. *Reuter in DC. Prodr.* xi. 21; *Reichb. Ic. Fl. Germ.* t. 1784.

WESTERN HIMALAYA; on grass, thyme, &c., from Kumaon, alt. 13,000 ft., *Strach. & Winterb.* (Orobanche n. 4), to Kashmir, alt. 7–11,000 ft.—DISTRIB. W. and Central Asia, Central and S. Europe.

Stem 6–12 in., often tuberous below, rarely as thick as a swan's quill. *Spike* 1–3 in. *Corolla* curved, glandular-pubescent. *Stamens* inserted low down in the tube.

7. **O. nicotianæ,** *Wight Ill.* 179, t. 158; stout or slender, puberulous, spikes many- and dense-fld., bracts lanceolate as long as the corolla-tube, calyx-segments almost as long subulate-lanceolate entire, corolla ¾ in. glabrous tube contracted in the middle, lobes pale blue glabrous crenate, filaments pubescent at the base only, anthers glabrous.

The DECCAN; common in and destructive of tobacco crops, *Wight.*

Stem 8–12 in., as thick as the little finger in Wight's specimen, much more slender in his figure, pale brown. *Scales* few, ovate, acuminate. *Spike* longer than the rest of the stem, cylindric, obtuse; bracts many-nerved. *Calyx* puberulous. *Corolla* quite glabrous, lobes small.—The contraction of the middle of the corolla-tube distinguishes this species. Wight regards the calyx-segments as bracteoles.

8. **O. Clarkei,** *Hook. f.*; glandular-puberulous, spike short rather lax-fld., bracts lanceolate half as long as the corolla-tube, calyx-segments nearly as long subulate-lanceolate, corolla 1 in. tube nearly straight not contracted in the middle, lobes blue glabrous crenate, filaments and anthers glabrous.

WESTERN TIBET; Karakoram or Artemisia, alt. 9000 ft., *Clarke.*

This Clarke was disposed to regard as a form of *O. nicotianæ*, which differs widely in the smaller flowers, and form of the corolla-tube.

SECT. II. **Trionychon,** *Wallr.* Bracteoles 2. (PHELIPÆA, *Reut. & Boiss.*)

* *Calyx divided to the base posteriorly, entire anteriorly.*

9. **O. indica,** *Ham. in Roxb. Fl. Ind.* iii. 27; puberulous or pubescent, stem often branched, spikes usually lax-fld., bracts ovate half as long as the corolla-tube, bracteoles filiform, calyx 4- or 5-toothed, corolla ¾–1 in. pubescent without and within, tube rather slender, lobes blue ciliate, anthers woolly. *Wall. Cat.* 3966, *in part*; *Benth. Scroph. Ind.* 55, *excl. localities.* Phelipæa indica, *G. Don Gen. Syst.* iv. 632; *Reuter in DC. Prodr.* xi. 8; *Dalz. & Gibs. Bomb. Fl.* 202. ? P. ægyptiaca, *Boiss. Fl. Orient.* iv. 499.

Throughout the plains of INDIA, especially in mustard crops.—DISTRIB. Central and Western Asia.

Stem 4–12 in., sometimes fastigiately branched from the base, often inclined. *Scales* very few, chiefly at the forks. *Spikes* many-fld.; bracts pubescent, lobes subulate. *Corolla* pubescent, ¾–1½ in. long; tube straight, almost funnel-shaped. *Filaments* smooth, except at the base, anthers almost woolly.—Probably a form of *O. ramosa.*

10. **O. ramosa,** *Linn.*; *Boiss. Fl. Orient.* iv. 498; furfuraceously pubescent or glabrate, usually much branched, spikes slender longer than

the stem narrowed upwards, bracts ovate caudate-acuminate shorter than the corolla-tube, calyx half the length of the corolla-tube, lobes slender subulate from a broad base, corolla pubescent without and within, tube narrow, lobes blue ciliate, filaments glabrous, anthers sparsely crinite or glabrous. *Reichb. Pl. Crit.* 933, 934, and *Ic. Fl. Germ.* t. 152. Phelipæa ramosa, *C. A. Mey.*; *Walp. Rep.* iii. 459; *Reut. in DC. Prodr.* xi. 8; *Wight Ic.* t. 1618. P. ægyptiaca, *Herb. Ind. Or. H. f. & T.*

KASHMIR, *Falconer*; Jamu and Banahal, alt. 6–7000 ft., *Thomson*.—DISTRIB. Westwards to Europe and N. Africa.

Stem 6–12 in., usually thick at the base and at once dividing into rather slender erect branches. *Scales* few. *Spikes* lax-fld.; bracts variable in length and in the length of the slender point; bracteoles filiform. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in. long; tube narrow white.—The slender spikes occupying usually two-thirds of the length of the plant are unlike those of any other Indian species. I suspect that *O. ægyptiaca*, Pers., is the same as this, but I have seen no authentic specimens of it. Boissier refers *O. indica*, Roxb., to *O. ægyptiaca*, I think erroneously.

** *Calyx divided to the base anteriorly and posteriorly; segments bifid, lobes subulate.*

11. **O. psila,** *Clarke mss.*; furfuraceously pubescent, stem simple slender, spike short lax-fld., bracts lanceolate as long as the flower, calyx half as long as the corolla blue curved pubescent without and within, lobes copiously ciliate, filaments pubescent, anthers sparsely crinite.

KASHMIR; at Mapanon, alt. 9000 ft., *Clarke*.

Stem 12–18 in., as thick as a goose-quill or less. *Scales* long, $\frac{1}{2}$–1 in., subulate-lanceolate. *Spike* 2–3 in., obtuse; lower bracts $\frac{3}{4}$ in. long; bracteoles filiform. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in. long, lobes almost villous within, 2 upper rounded, 2 lower elliptic.

5. BOSCHNIACKIA, *C. A. Mey.*

Robust, brown, leafless herbs; stem simple, scaly. *Flowers* in dense spikes, or racemes, bracteolate, ebracteolate. *Calyx* cup-shaped, truncate or unequally 5-toothed. *Corolla-tube* incurved; limb 2-lipped, upper lip erect hooded entire or 2-fid; lower very short, 3-lobed. *Stamens* subexserted; anther-cells equal, parallel, bases obtuse. *Ovary* 1-celled; placentas 2–3, 2-partite; stigma dilated, broadly 2-lobed. *Capsule* 2-valved, valves at first cohering with the style. *Seeds* numerous, minute, ellipsoid, subglobose or compressed, testa reticulate.—Species 5, N.E. Asia, N.W. America and the Himalaya.

B. himalaica, *Hook. f. & Thoms. Herb. Ind. Or.*; calyx truncate quite entire, flowers $\frac{3}{4}$ in. long, upper lip of corolla cymbiform entire, lateral lobes of lower minute subulate median obsolete, capsules $\frac{3}{4}$–1 in., seeds orbicular, testa very lax loosely reticulate.

TEMPERATE and SUBALPINE HIMALAYA, on Rhododendron roots; Garwhal and Kumaon, alt. 8–10,000 ft., *Strach. & Winterb.*; Sikkim, alt. 10–13,000 ft., *J. D. H.*, *Clarke*.

Plant 6–18 in. high, pale brown, base tuberous; stem often as thick as the thumb. *Scales* numerous, rigid, $\frac{1}{2}$–$\frac{3}{4}$ in., oblong or ovate-lanceolate, obtuse or acute. *Racemes* 3–8 in., stout, dense-fld., pale ochreous brown streaked with red brown; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., broadly ovate, acute or obtuse, half as long as the flower or longer; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in., stout. *Calyx-limb* quite entire. *Corolla* puberulous, erect, nearly straight. *Stamens* finally exserted, filaments glabrous except at the very base yellow; anthers small, blueish. *Ovary* with 2 or 3 placentas, each with revolute divisions covered with ovules. *Capsule* ovoid-oblong, thickly coriaceous, irregularly 2–3-valved; pedice

very stout, ½ in. *Seeds* chaff-like, $\frac{1}{30}$–$\frac{1}{40}$ in. diam., testa hyaline with large reticulations. —This differs widely from the N.E. Asiatic *B. glabra* in its much larger size, the flowers being twice as large, and the fruit three times. The capsule of *B. glabra* is not longer than the bracts, and its seeds are ellipsoid, $\frac{1}{100}$ in. long, with a close testa.

ORDER CV. **LENTIBULARIEÆ.** (By C. B. Clarke.)

Herbs, aquatic or in wet places. *Leaves* radical rosulate, or capillary multifid or obsolete. *Scapes* 1–∞-fld.; bracts small or 0. *Flowers* hermaphrodite, purple, yellow, or white. *Calyx* inferior, 2–5-lobed. *Corolla* 2-lipped, spurred; upper lip usually smaller, entire or emarginate, lower 3–5-lobed. *Stamens* 2, attached to the base of the corolla, alternate with the lobes of the lower lip, filaments broad curved; anther-cells 2, ovate, transversely confluent. *Ovary* superior, globose, 1-celled; style short, stigma unequally 2-lobed; ovules very many, on a free basal placenta, anatropal. *Capsule* globose, 2–4-valved, or irregularly breaking up. *Seeds* numerous, small, exalbuminous.—Species 180, in all climates.

Calyx deeply 2-lobed, lobes entire or minutely toothed . . 1. UTRICULARIA.
Calyx 4–5-lobed, more or less 2-lipped . . . . 2. PINGUICULA.

I. **UTRICULARIA,** *Linn.*

Herbs, floating or terrestrial. *Leaves* many-partite with capillary segments in the floating species, entire in the erect species; minute bladders frequently added. *Scapes* simple or branched; racemes few- or many-fld.; pedicels bracteate and often 2 bracteolate. *Calyx* 2-partite; lobes entire or nearly so, often enlarged in fruit. *Corolla* 2-lipped; upper lip entire or emarginate, lower larger 3–6-lobed; spur curved or straight. *Filaments* broad; anthers ovate, 2- or sub-1-celled. *Style* short, stigma unequally 2-lobed. *Seeds* ellipsoid or obovoid, scrobiculate or glochidiate, rarely reticulate or comose.—Species 150, extending nearly throughout the world.

The numerous small scapose species have evanescent rosulate radical leaves on very short creeping branches; but there are specimens from which it would appear that, when some of such species grow in running water, they may produce elongate branched stems, longer linear leaves, and reduced leaves with bladders.

* Stems floating, leaves submerged divided into capillary segments mostly interspersed with bladders; bracteoles 0.

† *Peduncles bearing about the middle a cluster of oblong vesicles.*

1. **U. stellaris,** *Linn. f. Suppl.* 86; flowers pedicellate yellow, calyx-segments ovate enlarged in fruit, corolla-spur shorter than the lower lip more or less curved pubescent or glabrous. *Roxb. Cor. Pl.* ii. 42, t. 180, and *Fl. Ind.* i. 143; *Wall. Cat.* 6400; *Wight in Hook. Bot. Misc.* iii. 91, *Suppl.* t. 27; *A. DC. Prodr.* viii. 3; *Wight Ic.* t. 1567; *Dalz. & Gibs. Bomb. Fl.* 135; *Boiss. Fl. Orient.* iv. 3. U. macrocarpa, *Wall. Cat.* 1494.

Throughout INDIA, in rice-swamps and jheels.—DISTRIB. Malaya, S.E. Asia, N. Australia. Nearly all Africa.

Leaves with bladders. *Peduncles* 2–8 in., erect out of the water, glabrous; whorl of vesicles ½–1 in. long, formed of the inflated bases of reduced branches with often subfoliaceous tips. *Pedicels* 1–8, ⅛ in., thickened, usually deflexed in fruit. *Corolla*

¼ in. diam. *Capsule* ⅙ in.; fruit-sepals ¼–⅓ in. *Seeds* thickly discoid, concavo-convex by the inflexion of the entire thin hardly winged margin.

VAR. *inflexa*; corolla white with violet stripes. U. inflexa, *Forsk. Fl. Æg. Arab.* 9; *Delile Fl. Æg.* 4, t. 4, fig. 1; *A. DC. Prodr.* viii. 4; *Boiss. Fl. Orient.* iv. 3. U. Thonningii, *Schum. Pl. Guin.* 12.—Bengal; frequent, *Clarke.*—Distrib. N. and Central Africa.—The spur of the corolla is frequently as pubescent and as little curved as in *U. stellaris.* Whether this plant be reckoned species or variety, it is by no means rare in Bengal.

†† *Peduncles ebracteate or with a few obscure scales.*

2. **U. flexuosa,** *Vahl Enum.* i. 198; flowers pedicelled yellow, calyx-segments ovate somewhat enlarged in fruit, corolla-spur nearly as long as the lower lip, margin of the seeds entire inflexed scarcely winged. *Blume Bijd.* 739; *A. DC. Prodr.* viii. 24; *Oliver in Journ. Linn. Soc.* iii. 175. U. australis, *Br. Prodr.* 430; *A. DC. l. c.* 6. U. fasciculata, *Roxb. Fl. Ind.* i. 143; *Wall. Cat.* 1499; *A. DC. l. c.* 7; *Wight Ic.* t. 1568. U. confervifolia, *Don Prodr.* 84; *A. DC. l. c.* 8. U. inæqualis, *Benj. in Linnæa,* xx. 304. U. Blumei, *Miq. Fl. Ind. Bat.* ii. 994. U. extensa, *Hance*; *Walp. Ann.* iii. 3.

Throughout INDIA; in rice-swamps, tanks, and jheels, common.—DISTRIB. S.E. Asia, Malaya, N. Australia.

Generally resembling *U. stellaris,* but rather larger in all its parts. *Corolla* ⅓–½ in. diam. *Calyx-segments* in fruit ovate, subacute, patent, hardly so long as the capsule. *Seeds* as of *U. stellaris,* but rather larger; margin thin, incurved towards the concave face, described by some authors as winged, by others as wingless.—The branches near the base of the peduncle are sometimes inflated, falsely whorled, bearing reduced leaves, but are always much longer and less bract-like than those of *U. stellaris.*

3. **U. punctata,** *Wall. Cat.* 2121; pedicels slender erect in fruit, flowers blue, capsule thin much longer than the calyx, seeds discoid margin thin sharply toothed. *A. DC. Prodr.* viii. 5; *Wight Ic.* t. 1570; *Oliver in Journ. Linn. Soc.* iii. 175.

PEGU and TENASSERIM; from Rangoon, *Wallich,* to Mergui, *Griffith,* &c.—DISTRIB. Borneo.

Leaves multipinnate, segments capillary, with bladders. *Peduncles* 6 in., 5–15-fld., glabrous; pedicels often ½–⅔ in. *Corolla* ¼ in. diam., blue (Parish); spur shorter than the lower lip. *Capsule* ⅙ in., ovoid, obtuse. *Seeds* differing little from *U. stellaris,* but the thin margin is patent or obscurely inflexed towards the concave face, with numerous triangular teeth.

4. **U. exoleta,** *Br. Prodr.* 430; leaves very small bearing bladders, peduncles slender 1–3-fld., flowers small yellow, capsule globose exceeding the fruit-sepals, seeds discoid margin thin patent subentire. *A. DC. Prodr.* viii. 7. U. diantha, *Roem. & Sch. Syst.* i. *Mant.* 169; *Wight Ic.* t. 1569; *Oliver in Journ. Linn. Soc.* iii. 175, *not of A. DC.* U. diflora, *Roxb. Hort. Beng.* 4. U. biflora, *Roxb. Fl. Ind.* i. 143, *not of Lamk., nor of Wall.* U. Roxburghii, *Spreng. Syst.* i. 52. U. elegans, *Wall. Cat.* 1502. U. pterosperma, *Edgew. in Proc. Linn. Soc.* i. 352.

Throughout INDIA, from the N.W. Himalaya and Assam to Ceylon, not common. —DISTRIB. S.E. Asia, Malaya, N. Australia.

Leaves sometimes 2–3 in., multipinnate, segments capillary, often inconspicuous or very slender, easily detached from the peduncle. *Peduncle* 1–4 in., minutely bracteate near the middle. *Corolla* ⅓ in. diam., spur slightly exceeding the lower lip. *Capsule* ⅙ in. diam., thin. *Seeds* subtrapezoidal, much depressed; margin somewhat

inflexed towards the concave face, minutely crenulate.—This species, much confused with species of other sections, is distinguishable by the globose (not compressed ovate) capsule, distinctly exceeding the sepals. The capillary bladder-bearing leaves are often absent in dried specimens; and similar small leaves occur in vegetative states of many of the so-called leafless species.

5. **U. minor,** *Linn.*; *Reichb. Ic. Fl. Germ.* t. 1826, fig. 1; corolla yellow, spur less than half as long as the lower corolla-lip, capsule globose as long as the calyx. *Lamk. Ill.* t. 14, fig. 2; *A. DC. Prodr.* viii. 7; *Oliver in Journ. Linn. Soc.* iii. 176.

ALPINE W. HIMALAYA; Nubra, alt. 11,000 ft., *Thomson.*—DISTRIB. Europe, W. and Central Asia.

Stems often 4–12 in., leafy. *Peduncles* 3–9 in., 2–8-fld.; usually minutely bracteate. *Corolla* ⅓ in.; lower lip much longer than the upper.—There are examples from the W. Himalaya and Alpine Sikkim, which may be referable to this species; but being flowerless, they are doubtful.

** *Leaves* at the base of the scape linear or spathulate, often evanescent before flowering. *Calyx-lobes* equal or nearly so. *Seeds* smooth, testa reticulate.

† *Scales of the scape and bracts attached by their bases.*

§ *Flowers purple, blue, or whiteish.*

6. **U. albo-cœrulea,** *Dalz. in Hook. Kew Journ.* iii. 279; glabrous, pedicels ¼ in. recurved in fruit, lower lip of corolla ½ in. diam. azure, spur ⅛ in. narrow-conic, seeds short-ellipsoid obtuse at both ends. *Oliver in Journ. Linn. Soc.* iii. 177; *Dalz. & Gibs. Bomb. Fl.* 135.

CONCAN; *Stocks*; at Vingorla, *Dalzell.*

Scapes 4–8 in., erect, 3–8-fld., leafless at flower-time. *Calyx-lobes* ovate, in fruit ¼ in., subacute. Lower lip of *corolla* suborbicular, slightly 4-lobed, upper ⅕ in.; spur pendent, nearly straight. *Seeds* scrobiculate, i.e. exterior cells of the testa oblong, subparallel to the longer diam. of the seed.

7. **U. arcuata,** *Wight Ic.* t. 1571, fig. 1; glabrous, pedicels ⅓ in. recurved in fruit, lower lip of corolla ½ in. diam. blue-purple, spur ⅓–½ in. linear curved, seeds ellipsoid. *Oliver in Journ. Linn. Soc.* iii. 177; *Dalz. & Gibs. Bomb. Fl.* 136.

W. DECCAN PENINSULA, from Bombay to Mysore; *Law, Ritchie,* &c.

Scapes 4–8 in., erect, 3–8-fld., leafless at flower-time or nearly so, sometimes bearing bladders on the rudimentary leaves. *Calyx-lobes* ovate, in fruit ¼ in., subacute. Lower lip of *corolla* suborbicular, scarcely lobed, upper ⅕ in.; spur pendent from the base, then much curved forwards. *Seeds* scrobiculate, outer cells of the testa elongate.

8. **U. affinis,** *Wight Ic.* t. 1580, fig. 1; glabrous, pedicels short, lower lip of corolla ¼–⅓ in. ovate purple-blue, spur ⅛–⅙ in. narrow-conic straight, seeds subglobose. *Oliver in Journ. Linn. Soc.* iii. 178. U. brachypoda, *Wight Ic.* t. 1578, fig. 1. U. decipiens, *Dalz. in Hook. Kew Journ.* iii. 279; *Dalz. & Gibs. Bomb. Fl.* 135.

W. DECCAN PENINSULA, from the Concan southward; *Wight, Law,* &c.

Scapes 2–6 in., erect, 3–6-fld., leafless at flower-time. *Pedicels* 1/12–¼ in., suberect in fruit. *Calyx-lobes* ovate, entire; in fruit ⅕ in. scarcely acute. Lower lip of *corolla* obtuse, scarcely emarginate, upper shorter than the spur; spur nearly at right angles

to the axis of the flower, slightly curved forwards. *Seeds* reticulate, cells of the testa subhexagonal not elongate.

VAR. *Griffithii*, Oliver; rather larger, scapes sometimes a foot, pedicels stouter, fruiting-calyx $\frac{1}{4}$ in. or more. U. Griffithii, *Wight Ic.* t. 1576. U. cœrulea, *Benth. Fl. Hongk.* 256, *not of Linn.*—Malay Peninsula, from Mergui to Singapore; *Griffith, Murton*, &c.—Distrib. Borneo, S. China.

9. **U. cœrulea,** *Linn.*; *Oliver in Journ. Linn. Soc.* iii. 179, *not of A. DC.*; glabrous, pedicels $\frac{1}{6}$–$\frac{1}{3}$ in., lower lip of corolla $\frac{1}{4}$–$\frac{1}{3}$ in. blue-purple, spur $\frac{1}{3}$ in. narrow-conic curved, seeds ellipsoid. U. uliginoides, *Wight Ic.* t. 1573. U. pedicellata, *Wight Ic.* t. 1578, fig. 2, *exclud. seeds.* ? U. graminifolia, *Vahl Enum.* i. 195; *DC. Prodr.* viii. 16. ? U. purpurascens, *Grah. Cat. Pl. Bombay*, 165.

MTS. of the DECCAN PENINSULA and CEYLON; frequent.

Scape 2–8 in., suberect, 3–12-fld., leafless at flower-time. *Pedicels* suberect in fruit. *Calyx-lobes* elliptic, acute, lower often minutely toothed; in fruit $\frac{1}{4}$ in. very acute. Lower lip of *corolla* ovate, subacute, upper $\frac{1}{6}$ in.; spur at base projecting backwards nearly in a line with the axis of the flower, then curved forwards. *Seeds* ellipsoid, outer cells of the testa oblong.—Wight's specimen of his *U. pedicellata* shows flowers only, and the seeds figured in his *Ic.* t. 1578, fig. 2, must have been taken from *U. affinis*. Thwaites (*Enum.* 171) unites *U. affinis* with *U. cœrulea*, but the latter has much acuter calyx-lobes, and different seeds. As to *U. acuta* (Benj. in Linn. xx. 314), doubtfully referred by Oliver to *U. affinis*, it is perhaps rather *U. cœrulea*, as the lower calyx-lobe is much oftener toothed in this species.

VAR. *conferta*; spur bent nearly at its base, so that it is pendent almost at right angles to the axis of the flower. U. conferta, *Wight Ic.* t. 1575.—Mts. of the S. Deccan Peninsula, *Wight.*

VAR. *squamosa*; scape with numerous scales (bracts to suppressed pedicels), flowers few subterminal, corolla rather larger than *U. cœrulea* type. U. squamosa, *Wight Ic.* t. 1579.—Nilgherry Mts., *Gardner*; Sispara, *Wight.* The examples are not in fruit.

VAR. *Smithiana*; scapes 1 foot sometimes twining, lower lip of corolla nearly $\frac{1}{2}$ in., spur $\frac{1}{3}$ in. U. Smithiana, *Wight Ic.* t. 1577. Utricularia sp. n. 27, *Oliver in Journ. Linn. Soc.* iii. 190.—Malabar or Coorg; *Wight.* This is referred by Oliver (*Journ. Linn. Soc.* iii. 180) to *U. cœrulea*, possibly correctly. Wight's Ic. t. 1577 however shows the seeds reticulate not scrobiculate, i. e. the outer cells of the testa are subhexagonal not oblong or elongate. If this is so, *U. Smithiana* is more nearly allied to *U. affinis*, and is probably a distinct species. The figure can hardly be trusted on such a point, and none of Wight's examples exhibits fruit.

10. **U. reticulata,** *Smith Exot. Bot.* t. 119; glabrous, flowers pedicellate often numerous, calyx-lobes acute, in fruit $\frac{1}{3}$ in. decurrent on the pedicel, lower lip of corolla $\frac{1}{2}$ in. blue, spur $\frac{1}{4}$ in. narrowly conic nearly straight, seeds obovoid scrobiculate. *Wall. Cat.* 1493; *A. DC. Prodr.* viii. 19; *Wight Ill.* ii. t. 143; *Oliver in Journ. Linn. Soc.* iii. 180; *Dalz. & Gibs. Bomb. Fl.* 135. U. uliginosa, *Wight Ic.* t. 1574, *right-hand plant only.* U. graminifolia, *Grah. Cat. Pl. Bombay*, 165, *not of Spreng.* U. oryzetorum, *Miq. in Pl. Hohenack.* n. 574.—*Rheede Hort. Mal.* ix. t. 70.

W. DECCAN PENINSULA, from the Concan southwards, and CEYLON; frequent.

Scapes usually elongate, 10–24 in., slender, twining, flower-bearing for half their length; small suberect, few-flowered forms (*Wight Ic.* t. 1574, *right-hand plant*) are slenderer than *U. uliginosa*, Vahl. *Pedicels* $\frac{1}{4}$–$\frac{1}{3}$ in.; bracteoles filiform. Lower lip of *corolla* broadly ovate, scarcely emarginate; upper $\frac{1}{4}$ in. *Seeds* somewhat rhomboid, hilum prominent; cells of the testa oblong, oblique to the long axis of the seed.

VAR. *uliginosa* (Vahl Enum. i. 203); glabrous, flowers pedicelled often numerous, calyx-lobes acute, in fruit $\frac{1}{4}$–$\frac{1}{3}$ in. decurrent on the pedicel, lower lip of corolla $\frac{1}{4}$ in. blue, spur $\frac{1}{6}$–$\frac{1}{4}$ in. conic nearly straight, seeds obovoid scrobiculate. *A. DC. Prodr.*

viii. 15; *Wight Ic.* t. 1574, *two left-hand plants.* U. humilis, *Heyne*; *Wall. Cat.* 1495; *Wight Ic.* t. 1572, *not of Vahl.* U. reticulata var. β, *Oliver in Journ. Linn. Soc.* iii. 180 U. polygaloides, *Edgew. in Proc. Linn Soc.* i. 351.—S. Deccan Peninsula and Ceylon, frequent. Bengal; Burdwan, *Edgeworth. Scape* 2–6 in., erect, much thicker than in the starved examples of *U. reticulata. Pedicels* ¼ in.: bracteoles linear, less pointed than in *U. reticulata. Seeds* as of *U. reticulata*, but smaller and more finely scrobiculate.

11. **U. scandens,** *Benj. in Linnæa*, xx. 309, *partly*; minute, twining, glabrous, calyx-lobes in fruit ⅛ in. obtuse, lower lip of corolla ⅛–⅙ in. blue, seeds minute obovoid laxly scrobiculate. *Oliver in Journ. Linn. Soc.* iii. 181. U. volubilis, *Wight in Herb. Propr.*

Near MADRAS; Madura Hills, *Wight, Shuter.*

Scapes 1–6 in., exceedingly slender, twining on *U. Wallichiana* & *uliginosa. Pedicels* ⅛ in., scattered. *Seeds* minute; testa very lax, almost wrinkled, cells large oblong.

VAR. *capillacea*; scape most slender not twining, calyx-lobes in fruit $\frac{1}{12}$ in. very obtuse. U. capillacea, *Wall. Cat.* 6399; *Oliver in Journ. Linn. Soc* iii. 184, *not of Herb. Wight.*—Madras; *Wight.* U. capillacea, *Wight Herb*, is *U. Wallichiana, Wight Ic.* t. 1572, fig. 1. The fragments in Wallich's Herbarium (1½ in. long) of *U. capillacea*, Vahl, and which are said to have come from Wight's Herbarium, appear to have had blue flowers. Wallich seems to have affixed the name *capillacea* on his own, not Wight's authority.

12. **U. hirta,** *Klein; Oliver in Journ. Linn. Soc.* iii. 183; hairy, flowers subsessile, lower lip of corolla ¼ in. blue, spur ⅓ in. curved. *A. DC. Prodr.* viii. 25. U. setacea, *Wall. Cat.* 6398, *partly.*

DECCAN PENINSULA (*Klein*). CHOTA NAGPORE; alt. 2000 ft., *Clarke.* KHASIA MTS.; alt. 3–5000 ft., *Griffith, H.f. & T.*, &c.

Scapes 3–8 in., erect, slender, minutely densely villous. *Calyx-lobes* orbicular, in fruit $\frac{1}{16}$ in. *Capsule* $\frac{1}{10}$ in., globose. *Seeds* minute, ovoid, obscurely scrobiculate.—By the subsessile flowers and small globose capsules this seems allied to *U. racemosa*, as Prof. Oliver states; but the bracts not being produced backwards below their point of insertion, it must be placed here in the artificial arrangement adopted.

§§ *Flowers yellow.*

13. **U. bifida,** *Linn.*; *A. DC. Prodr.* viii. 21; pedicels finally recurved, calyx-lobes in fruit ¼ in. ovate obtuse, lower lip of corolla ¼ in., spur nearly ¼ in. curved, seeds obovoid, testa lax scrobiculate. *Oliver in Journ. Linn. Soc.* iii. 182 (exclud. syn. *U. humilis*). U. biflora, *Wall. Cat.* 1498, *not of Roxb.* U. diantha, *A. DC. l. c.* 21, *exclud. most syn.* U. Wallichiana, *Benj. in Bot. Zeit.* 1845, 213. U. brevicaulis, *Benj. in Linnæa*, xx. 303.

Throughout INDIA, from Nepal and Assam to Ceylon and Malacca.—DISTRIB. E. Asia from Japan to Borneo and the Philippines.

Scapes 2–7 in., erect, glabrous, many-fld. *Pedicels* ⅛ in. *Seeds* almost wrinkled owing to the very lax testa; cells of the testa oblong, oblique to the longer axis of the seed.

14. **U. Wallichiana,** *Wight Ic.* t. 1572, fig. 1; stems very slender often twining, pedicels 0–¼ in. suberect in fruit, calyx-lobes in fruit ⅕ in. ovate acute, lower lip of corolla ⅕ in., spur nearly as long, seeds ellipsoid scrobiculate without papillæ or glochidia. *Oliver in Journ. Linn. Soc.* iii. 182. U. scandens, *Benj. in Linnæa*, xx. 309, *in most part.* U. macrolepis, *Wight Ic.* t. 1580, fig. 2, *exclud. seeds.* U. capillacea, *Thwaites Enum.* 171, *not of Oliver.*

Hills of the S. DECCAN PENINSULA and CEYLON; *Wight, Thwaites*, &c.

In his Herbarium Wight has marked his n. 2709 one sheet *U. Wallichii*, the other *U. macrolepis*; of this the seeds exhibit none of the glochidia shown in Wight's figure of *U. macrolepis*, and insisted on in the accompanying description.

VAR. *firmula*, Oliver in Journ. Linn. Soc. iii. 182; stems stouter erect.—Khasia Mts., alt. 3–5000 ft., common. ALPINE SIKKIM, alt. 9–11,000 ft.; Lachen, *J. D. H.*—The Sikkim examples are 1–2 in. high, but appear to be high-level forms of the Khasian plant.

†† *Scales of the scape and bracts produced backwards below their point of insertion.*

15. **U. verticillata,** *Benj. in Linnæa*, xx. 312; glabrous, scapes often branched, pedicels (many of them) as long as the fruit-calyx, lower lip of corolla $\frac{1}{6}$ in. *Oliver in Journ. Linn. Soc.* iii. 184. U. bifida, *Wight Ic.* t. 1584, fig. 2, *not of Linn.*

MALACCA, *Griffith.*

Scapes 6–10 in. *Pedicels* $\frac{1}{3}$ in. *Calyx-lobes* in fruit $\frac{1}{12}$ in., ovate, obtuse. *Capsule* $\frac{1}{10}$ in., globose. *Seeds* minute, cells of the testa subhexagonal rather than oblong.

16. **U. rosea,** *Edgew. in Proc. Linn. Soc.* i. 352; flowers subsessile, lower lip of corolla nearly $\frac{1}{3}$ in. exceeding the obtuse spur. *Oliver in Journ. Linn. Soc.* iii. 184.

BENGAL? *Edgeworth.* CEYLON; *Gardner.*

The plant here diagnosed is *Gardner's* n. 507, which is the type of *U. rosea*, Oliver. Whether any such plant was ever found in Bengal is doubtful, there being no type of Edgeworth's to refer to. Oliver quotes for this species U. racemosa, *Wight Ic.* t. 1584, fig. 1, which looks more like *U. racemosa*, Wall., with the flower drawn a little large; the seeds are like none of this set, in all of which they are minute with large obscurely-marked scrobiculations. According to Thwaites (*Enum.* 172), *U. rosea, racemosa* and *filicaulis* are forms of one species.

17. **U. racemosa,** *Wall. Cat.* 1496; glabrous, scapes 6–16 in. sometimes branched, flowers subsessile numerous blue lower distant uppermost often subcapitate, lower lip of corolla $\frac{1}{8}$ in. hardly as long as the subacute spur. *A. DC. Prodr.* viii. 21; *Oliver in Journ. Linn. Soc.* iii. 186. U. complanata, *Wall. Cat.* 1497. U. cœrulea, *A. DC. l. c.* 19; *Wight Ic.* t. 1583, *not of Linn.*

KHASIA MTS., alt. 3–5000 ft., common. CHOTA NAGPORE; *Clarke.* DECCAN PENINSULA and CEYLON; *Wight*, &c. PEGU; *Kurz.*—DISTRIB. Cambodia, China.

Flowers often subfasciculate on the spike. *Calyx-lobes* orbicular in fruit, $\frac{1}{10}$–$\frac{1}{8}$ in., obtuse. Lower lip of *corolla* blue or whiteish, obscurely 4-lobed. *Capsule* $\frac{1}{10}$ in., globose. *Seeds* minute, obscurely coarsely scrobiculate.

VAR. *filicaulis*; stem slender with fewer scattered flowers. U. filicaulis, *Wall. Cat.* 1501; *A. DC. l. c.* 21; *Oliver in Journ. Linn. Soc.* iii. 186. U. nivea, *Vahl Enum.* i. 203; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* i. 144; *Wight Ic.* t. 1582; *Dalz. & Gibs. Bomb. Fl.* 135. U. setacea, *Wall. Cat.* 6398, *partly.* U. campestris, *Miq. in Pl. Hohenack.* n. 596.—From Nepal and the Khasia Mts. to Ceylon and Tenasserim (S.E. Asia and Malaya to Hongkong and Borneo).

*** *Leaves* at the base of the scape orbicular or reniform, persistent. *Calyx-lobes* very unequal. *Seeds* glochidiate (or in *U. kumaonensis* comose).

18. **U. brachiata,** *Oliver in Journ. Linn. Soc.* iii. 187; scape slender 1–2-fld., leaves reniform slenderly petioled, lower lip of corolla $\frac{1}{4}$–$\frac{1}{3}$ in. 5-lobed, spur $\frac{1}{3}$ in. linear-cylindric obtuse.

ALPINE SIKKIM, alt. 8–11,000 ft., *J. D. H.*

Scapes 2–3 in. *Leaves* $\frac{1}{6}$ in. diam.; petiole $\frac{1}{3}$ in., linear. *Pedicels* $\frac{1}{4}$ in.; bracts minute, ovate. *Calyx*, upper segment $\frac{1}{10}$ in., ovate, purple. *Corolla* white, yellow-spotted. *Seeds* not seen.

19. **U. orbiculata,** *Wall. Cat.* 1500; scape slender 1–5-fld., leaves petioled orbicular, lower lip of corolla $\frac{1}{4}$ in. 5-lobed yellowish, spur $\frac{1}{3}$ in. linear acute, seeds obovoid glochidiate. *A. DC. Prodr.* viii. 18; *Oliver in Journ. Linn. Soc.* iii. 187; *Dalz. & Gibs. Bomb. Fl.* 136. U. pusilla, *Grah. Cat. Pl. Bomb.* 165. U. glochidiata, *Wight Ic.* t. 1581.

Almost throughout INDIA in the hills: Himalaya Mts., alt. 3–8000 ft., from Nepal to Bhotan, common; Khasia Hills frequent; W. Deccan Peninsula and Ceylon; Tenasserim to Malacca.—DISTRIB. Malaya, S. China.

Scapes 2–5 in., slender. *Leaves* $\frac{1}{8}$ in. diam.; petiole $\frac{1}{4}$ in. *Pedicels* $\frac{1}{4}$ in. Lower lip of *corolla* broader than long, with 5 subequal obtuse short lobes (more unequal in an example of Parish from Moulmein); pinkish or whiteish, but the spots or tinge of yellow usually prevailing.

20. **U. multicaulis,** *Oliver in Journ. Linn. Soc.* iii. 188; scape 1–3-fld., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{8}$ in. 3–4-(sometimes 6-) lobed, spur $\frac{1}{10}$ in. linear-cylindric obtuse.

ALPINE SIKKIM; Lachen, alt. 10–11,000 ft.; Lachoong, alt. 6–7000 ft., *J. D. H.*

Tufted; scapes 1–2 in. crowded stouter than those of *U. orbiculata. Pedicels* 0–$\frac{1}{3}$ in. *Flowers* pale-flesh colour, throat yellow. *Seeds* not seen.—Allied to *U. orbiculata,* from which it differs at first sight by the much smaller flowers.

21. **U. furcellata,** *Oliver in Journ. Linn. Soc.* iii. 189; scape 2–6-fld., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{8}$–$\frac{1}{6}$ in. 4-lobed purplish, spur $\frac{1}{8}$–$\frac{1}{3}$ in. linear curved.

SIKKIM HIMALAYA; at Darjeeling, alt. 7–9000 ft., frequent (*Herb. Griffith,* &c.).

Scape 2–3 in., slender, resembling that of *U. orbiculata.* Lower lip of *corolla* narrower than broad, purple pink or white, not distinctly yellow. *Seeds* obovoid, glochidiate, as of *U. orbiculata.*—Known in the field from *U. orbiculata* by the smaller, less yellow, flowers.

VAR. *minor;* scapes $\frac{1}{2}$–1 in. very slender 1–3-fld.—Temp. Sikkim; Lachen, *J. D. H.* Khasia Mts., Boga Pani, *J. D. H.* These examples were the type of *U. furcellata,* Oliver; the plentiful arrival of subsequent material shows the "larger Darjeeling form" referred to by Oliver to be the fairly developed state of the species.

22. **U. kumaonensis,** *Oliver in Journ. Linn. Soc.* iii. 189; scape slender 1–3-fld., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{8}$–$\frac{1}{6}$ in. 5-lobed, spur $\frac{1}{8}$ in. narrowly cylindric, seeds with a tuft of hairs at each end. Diurospermum album, *Edgew. in Proc. Linn. Soc.* i. 351.

TEMPERATE W. HIMALAYA; Kumaon, alt. 7500 ft., near the river Pilti, *Strach. & Winterb.*

Resembling altogether *U. furcellata*; but the lower lip of the corolla is 5-lobed, the spur shorter. The young seeds are ellipsoid, smooth, scabrous-papillose at each end; the ripe seeds have at their end tufts of capillary hairs as long as the seed.

IMPERFECTLY KNOWN SPECIES.

1. U. MINUTISSIMA, *Vahl Enum.* i. 204; scape 2–3 in. capillary, bracts basifixed, flowers blue subsessile, calyx-lobes subobtuse. *DC. Prodr.* viii. 16; *Oliver in Journ. Linn. Soc.* iii. 190.—Malacca (*Koenig*). The basifixed scales will not do for *U. racemosa,*

nor the blue flowers for *U. bifida*; and there is no other known Malacca species that will at all suit.

2. U. FOVEOLATA, *Edgew. in Proc. Linn. Soc.* i. 351; scape twining leafless 2–6-fld., bracts transfixed, calyx-lobes ovate acute, corolla purple, seeds glistening punctate.—Bengal; *Edgeworth.* Near *U. uliginosa* (ex Edgew.), but from the description of the seeds perhaps rather allied to *U. affinis.*

3. U. ALATA, *Benj. in Bot. Zeit.* 1845, 212; leafless, scape 1–2 in. 2–3-fld., scales basifixed, calyx-lobes ovate equal subacute decurrent on the pedicel, corolla longer than the calyx, spur conic acute longer than the calyx.—"India" (*Benjamin*). Neither the shape of the corolla-lip, its colour, nor any account of the seeds is supplied.

4. U. SQUAMOSA, *Benj. in Bot. Zeit.* 1845, 212; leafless, scape 3 in. 3–fld., scales attached by their middle, flowers subsessile, calyx-lobes equal orbicular-ovate obtuse. —Nepal (*Benjamin*). Benjamin's description fits very well the common *U. racemosa.* This species however must have been so well known to Benjamin that he would hardly publish it again under a new name; hence Oliver records *U. squamosa* as an indeterminate species.

5. U. PAUCIFOLIA, *Benj. in Linnæa*, xv. 309; leaves $\frac{1}{7}$–$\frac{1}{5}$ in. oblong obtuse, petiole $\frac{1}{8}$ in., scape 4 in., pedicels exceedingly short, calyx-lobes $\frac{1}{8}$ in. equal obtuse.—India (*Benjamin*). Supposed by Oliver to be near *U. racemosa.*

6. U. OBTUSILOBA, *Benj. in Linnæa*, xx. 312; leaves $\frac{1}{6}$ in. ovate obtuse, petiole $\frac{1}{6}$ in., scapes 3–20 in., scales fixed by their middle, calyx-lobes round obtuse.—Ceylon, Nepal, China (*Benjamin*). Also supposed by Oliver to be near *U. racemosa.*

7. U. ALBIFLORA, *Griff. Notul.* iv. 168; leafless, scapes simple filiform, pedicels bracteolate at the base, corolla white, lower lip yellow-spotted, spur acutely conic a little longer than the lower lip.—Mergui; *Griffith.*

8. U. LILACINA, *Griff. Notul.* iv. 168; leafless, raceme few-fld., fruit-pedicels erect, calyx-lobes equal acute, corolla lilac-blue, lower lip with a yellow spot, spur conic-subulate as long as the lower lip.—Mergui; *Griffith.*

9. U. CAPILLARIS, *Don Prodr.* 85; leafless, scape 3–4 in. capillary few-fld., lower calyx-lobe (?) ovate acute longer, corolla blue, spur conic. *DC. Prodr.* viii. 90.—Nepal (*D. Don*).

10. U. RAMOSA, *Vahl Enum.* i. 204; leafless, scape few-fld., flowers small, spur conic short, fruit-pedicels recurved. *DC. Prodr.* viii. 25.—Deccan Peninsula (*Koenig*). Doubtfully referred by Oliver to *U. flexuosa*; it appears as likely to be *U. cærulea* or one of that section.

U. ambigua is recorded as Indian by DC. (Prodr. viii. 9) on the faith of a wrong field determination of a specimen by Wallich.

II. **PINGUICULA,** *Linn.*

Herbs. *Leaves* radical, rosulate, entire. *Scapes* erect, 1-fld., leafless, ebracteate. *Calyx* 4–5-lobed, more or less 2-lipped. *Corolla* 2-lipped, spurred, purple or yellow. *Anthers* ovate, sub-1-celled. *Style* short, stigma very unequally 2-lobed. *Seeds* ellipsoid.—Species 15, all extra-tropical.

P. alpina, *Linn.*; *Reichb. Iconogr.* t. 81, fig. 166; leaves subsessile elliptic sparsely hairy on the upper surface, corolla white yellow-spotted, spur hardly $\frac{1}{3}$ as long as the corolla. *DC. Prodr.* viii. 31; *Oliver in Journ. Linn. Soc.* iii. 190. U. flavescens, *Flörke*, and brachyloba, *Ledeb.*; *Reichb. Inconogr.* t. 81, fig. 168, 187.

ALPINE HIMALAYA, alt. 11-13,000 ft.; Kumaon, *Strach. & Winterb.*, *T.*

Anderson; Sikkim, *J. D. H.*—DISTRIB. N. and Alpine Europe; N. and Central Asia.

Leaves 1½ by ⅔ in. *Scapes* 2–6 in., glabrous. *Corolla* ⅓–½ in. *Capsule* ¼ in., ellipsoid, 2-valved. *Seeds* elongate ellipsoid, testa smooth, cells oblong.

ORDER CVI. **GESNERACEÆ.** (By C. B. Clarke.)

Herbs or undershrubs. *Leaves* opposite alternate or solitary, undivided, entire or toothed; stipules 0. *Peduncles* axillary or terminal, rarely 1-fld., bracteate; bracteoles usually small. *Flowers* hermaphrodite, rarely regular. *Calyx-segments* 5, valvate or open in the bud (imbricate in *Monophyllæa*). *Corolla* gamopetalous; tube long or short; segments usually 5, imbricate in the bud. *Stamens* on the corolla-tube mostly didynamous, often 2 only fertile, rarely 5 fertile; anthers 2-celled, often early confluent 1-celled. *Disc* annular or shortly cylindric or 0, sometimes unilateral. *Ovary* 1-celled or sub-2-celled; style linear, stigma small capitate or 2-lobed; placentæ parietal, bifid; ovules very many, anatropal. *Fruit* capsular or berried, dehiscent or indehiscent. *Seeds* very many, minute, fusiform or ovoid, smooth; testa reticulate, often striate, albumen 0 or scanty; embryo straight.—Species 800, mostly in S.E. Asia, Polynesia and Tropical America.

The Ordinal character above given is narrowed to the Old World species of the Order, which all belong to the Suborder *Cyrtandreæ*. The *Eugesnereæ* of the New World have the ovary more or less inferior. The leaf when solitary on the plant is sometimes a highly developed cotyledon.

Subtribe 1. TRICHOSPOREÆ. Seeds tipped with a very long hair. *Capsule* long-linear, loculicidally 2-valved; placentæ bifid, recurved, enrolled, covering the seeds, not seed-bearing on their axial faces.

Leaves subentire, fleshy. Stamens 4 perfect, exserted . . 1. ÆSCHYNANTHUS.
Leaves subcoriaceous. Stamens 2 perfect included . . . 2. LYSIONOTUS.
Leaves membranous, hairy. Stamens 4 perfect included . 3. LOXOSTIGMA.

Subtribe 2. DIDYMOCARPEÆ. Capsule loculicidally 2-valved, often ultimately 4-valved; placentæ deeply intruded nearly meeting, not seed-bearing on their inner faces (except in ****). *Seeds* without hairs.

* *Capsule linear or elongate-lanceolate, valves* 2 *straight not* (*or very late*) 4-*valved, in* Didymocarpus *frequently subfollicular.*

Stigma oblique, emarginate. Stamens 2 perfect . . . . 4. DIDYMOCARPUS.
Stigma ultimately shortly bifid. Stamens 2 perfect . . . 6. CHIRITA.
Leaves several. Stamens 4 perfect . . . . 5. DIDISSANDRA.
A 1-leaved herb. Stamens 4 perfect . . . . 7. PLATYSTEMMA.

** *Capsule narrowly lanceolate, valves* 2 *straight soon again bipartite* (*capsule usually subequally* 4-*valved*).

A low herb. Leaves opposite. Stamens 4 perfect . . . 8. CHAMPIONIA.
Undershrubs. Leaves alternate. Stamens 4 perfect . . . 9. BŒICA.
Flowers capitate. Corolla silky without. Stamens 2 perfect 10. TETRAPHYLLUM.
Cyme lax, few-flowered. Calyx 3-sepalous. Stamens 2 perfect 11. TRISEPALUM.

*** *Capsule linear or elongate-lanceolate, valves* (*even before dehiscence*) *spirally twisted.*

Calyx distinctly 2-lipped, sub-3-sepalous . . . . 12. PHYLLOBÆA.

Corolla-lobes 5, subsimilar, round . . . . 13. BŒA.
Corolla 2-lipped, lower lip larger reflexed . . . . 14. ORNITHOBŒA.

**** *Capsule ellipsoid or ovoid, hardly exceeding the calyx, placentæ bearing seeds on all sides.*

Caulescent. Stamens 4 perfect . . . . 15. KLUGIA.
Caulescent. Stamens 2 perfect . . . . 16. RHYNCHOGLOSSUM.
Scapose. Stamens 4 perfect . . . . 17. JERDONIA.

Subtribe 3. LEPTOBŒÆ. Capsule septicidally 2-valved. *Seeds* without hairs.

Twiggy. Cyme-branches capillary . . . . 18. LEPTOBŒA.

Subtribe 4. EPITHEMEÆ. Capsule circumsciss. Seeds without hairs.

A succulent herb. Flowers subcapitate . . . . 19. EPITHEMA.

Subtribe 5.' EUCYRTANDREÆ. Berry indehiscent, succulent or membranous, breaking up irregularly, in *Cyrtandromœa* sometimes loculicidally 2-valved. *Seeds* without hairs.

Leaf solitary. Flowers racemose. Sepals imbricate. Stamens 4 perfect . . . . 20. MONOPHYLLÆA.
Calyx urceolate, enclosing the fruit. Stamens 4 perfect . . 21. CYRTANDROMŒA.
Calyx plicate. Anthers cruciate. Stamens 4 perfect . . 22. STAURANTHERA.
Undershrubs. Leaves all alternate. Stamens 4 perfect . . 23. ISANTHERA.
Undershrubs. Uppermost leaves opposite. Stamens 4 perfect. 24. RHYNCHOTECHUM.
Undershrubs. Corolla tubular. Stamens 2 perfect . . . 25. CYRTANDRA.

I. **ÆSCHYNANTHUS,** *Jack.*

Epiphytic undershrubs. *Leaves* opposite, equal, fleshy or leathery, entire rarely obscurely toothed; nerves obscure. *Peduncles* terminal or axillary, 1- or 2-fld., rarely cymose, solitary or clustered; bracts ovate, usually small, sometimes large coloured, deciduous. *Calyx* truncate, 5-fid, or 5-partite. *Corolla* tubular-ventricose, rarely small or greenish; limb 2-lipped. *Stamens* 4 perfect, didynamous; anthers oblong, equalling the corolla or much exserted, usually coherent in pairs by the tips; rudimentary fifth rarely present. *Disc* annular. *Ovary* superior, stipitate, oblong or linear; stigma peltate; placentæ deeply inflexed, then recurved bearing the ovules. *Capsule* long-linear, loculicidally 2-valved; valves placentiferous. *Seeds* very many, small, sessile, pendulous, oblong, rugose, with one or more hairs at the end next the hilum, and one at the apex.—Species 52, Indian and Malayan, extending from Kumaon and Ceylon to Hongkong and the Philippines.

Æschynanthus, Jack, was published Jan., 1823; but *Trichosporum*, D. Don, being published July, 1822, has the right of priority; *Æschynanthus*, however, having been accepted for half a century, it would not be expedient to relinquish it.

Sect. 1. **Politrichium.** *Seeds* with many hairs near the hilum, and one hair at the apex.

1. **Æ. longicaulis,** *Wall. Cat.* 888; glabrous, leaves lanceolate obscurely falcate, sepals narrowly linear-lanceolate. *Br. in Pl. Jav. Rar.* 116; *A. DC. Prodr.* ix. 262.

TENASSERIM; Chappedong, *Wallich*; Mergui, *Griffith*; Moulmein, *Parish* (*Ic. Ined. Kew*).

Stem long, branched, terete. *Leaves* $3\frac{1}{2}$ by $\frac{2}{3}$ in., base cuneate or rhomboid, fleshy, midrib slender, nerves obscure; petiole $\frac{1}{8}$ in. *Pedicels* lateral and terminal, 1–3 together, $\frac{1}{6}$–$\frac{1}{3}$. in. *Sepals* free, $\frac{1}{3}$ by $\frac{1}{30}$ in. *Corolla* $\frac{2}{3}$ in., glabrous without. *Filaments* much exserted, glandular-hairy. *Capsule* 8 by $\frac{1}{6}$ in. *Seed* $\frac{1}{40}$ in., oblong, rough; hilar hairs 30–40, $\frac{1}{2}$ in. long.

Sect. 2. **Diplotrichium.** *Seeds* with two hairs near the hilum, one at the apex.—Seeds in n. 2 unknown, in nn. 3, 7 require verification: nn. 4, 5, 6 are perhaps but one species.

2. **Æ. fulgens,** *Wall. Cat.* 797; leaves narrowly lanceolate succulent, pedicels terminal clustered, calyx $\frac{1}{2}$ in. nearly glabrous, corolla 2 in. pubescent without. *Br. in Pl. Jav. Rar.* 115; *DC. Prodr.* ix. 261; *Bot. Mag.* t. 4891.

TAVOY; *Wallich.*

Glabrous except the inflorescence. *Branches* very thick. *Leaves* 5 by 1 in., acute; petiole $\frac{1}{6}$–$\frac{1}{3}$ in., very thick. *Pedicels* $\frac{1}{3}$ in., nearly glabrous. *Calyx* narrowly tubular; teeth $\frac{1}{12}$–$\frac{1}{8}$ in., triangular. *Corolla* narrow tubular-funnel-shaped, scarlet, mouth orange purple-marked. *Filaments* far exserted, nearly glabrous. *Seeds* unknown.—Brown assumed the seed to have but one hair at the hilar end, and placed this species (doubtfully) in sect. *Holocalyx*, which the inflorescence and stout stem do not suit.

3. **Æ. Hookeri,** *Clarke*; glabrous except the corolla, leaves lanceolate, pedicels terminal umbelled, calyx tubular scarlet very shortly obtusely lobed. Æ. parasitica, *Clarke Comm. & Cyrt. Beng.* t. 49, *not of Wall.*—Æschynanthus sp. n. 14, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA; alt. 4–6000 ft., *J. D. H.*, *Clarke.*

Stem branched, terete. *Leaves* $3\frac{1}{2}$ by 1 in., acuminate, base cuneate, fleshy, midrib beneath broad, nerves obscure; petiole $\frac{1}{3}$ in. *Pedicels* 3–8, $\frac{1}{3}$–$\frac{1}{2}$ in.; bracts $\frac{1}{3}$ in., narrowly oblong; branch after flowering often growing on through the umbel. *Calyx-tube* nearly $\frac{1}{2}$ in., teeth $\frac{1}{5}$–$\frac{1}{6}$ in. *Corolla* more than 1 in., curved, hairy without, orange-red, the lobes orange black-spotted. *Filaments* far exserted, glandular-hairy; anthers $\frac{1}{6}$ in., narrowly oblong. *Ovary* glabrous; style glandular-hairy. *Capsule* and *seeds* not now at hand; but the species seems very near *Æ. grandiflora*, and (it is believed) was ascertained to belong to sect. *Diplotrichium.*

4. **Æ. grandiflora,** *Spreng. Syst.* iv. 238; glabrous except the corolla, leaves lanceolate, pedicels clustered, calyx $\frac{1}{2}$ in. lobes shorter than the tube, corolla $1\frac{1}{2}$ in. inflated upwards. *DC. Prodr.* ix. 261; *Bot. Mag.* t. 3843; *Paxt. Mag.* v. 241, *with fig.* Æ. parasitica, *Wall. Cat.* 796, *partly.* Æschynanthus sp., *Griff. Itin. Notes*, 28, n. 427, and *Ic. Pl. Ind. Or.* t. 441 (*not descr. of t.* 441 *in Griff. Notul.* iv. 156). Incarvillea parasitica, *Roxb. Cor. Pl.* iii. 88, t. 291, and *Fl. Ind.* iii. 112. Trichosporum grandiflorum, *Don Prodr.* 125.

KHASIA MTS., alt. 0–3500 ft.; *Wallich, Griffith, H.f. & T.*

Stem terete, branched. *Leaves* 4 by 1 in., narrowed at both ends, often sinuate; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Pedicels* $\frac{1}{8}$–$\frac{1}{2}$ in., terminal; more rarely on spurs, quasi-axillary. *Calyx* herbaceous; lobes variable, sometimes very short obtuse as in Roxburgh's type, sometimes lanceolate acute as long as the tube. *Corolla* red, lobes orange marked with black-purple, mouth subcontracted. *Filaments* far exserted, glandular-hairy; anthers $\frac{1}{12}$ in., shortly oblong. *Capsule* 6 by $\frac{1}{4}$ in.

VAR. *parasitica,* Wall. Cat. 796, chiefly; leaves narrower, calyx and corolla rather smaller, calyx-lobes acutely lanceolate slightly longer than the tube. *Br. in Pl. Jav. Rar.* 2, p. 115; *Lindl. Bot. Reg.* 1841, t. 49; *Maund. Bot.* iv. t. 167.—Khasia Mts.; *Wallich.* Whether Wallich's *Æ. parasitica* was Roxburgh's *Incarvillea parasitica* has been long disputed. The type sheet of Wall. Cat. 796 has three

branches on it, whereof one is Roxburgh's plant, the second is that here called Wallich's var. *parasitica*, the third is the remote *Æ. micrantha*. The distributed sheets of Wall. Cat. 766 contain these three plants mixed in varying proportions.

5. **Æ. ramosissima,** *Wall. Cat.* 799, and *Pl. As. Rar.* i. 55, t. 71; glabrous except the corolla, leaves broadly lanceolate, pedicels clustered, calyx $\frac{1}{3}$ in. lobes lanceolate longer than the tube, corolla 1 in. scarcely contracted at the mouth. *DC. Prodr.* ix. 260; *Paxt. Mag.* vi. 195, *with fig.*; *Wight Ill.* t. 159 b, fig. 11, *many-haired seed excl.*; *Griff. Ic. Pl. Ind. Or.* t. 443, fig. 5; *Clarke Comm. & Cyrt. Beng.* t. 50. Æ. parviflora, *G. Don Gen. Syst.* iv. 656; *DC. Prodr.* ix. 261. Trichosporum parviflorum, *Don Prodr.* 125.

SUBTROPICAL HIMALAYA, alt. 3–4000 ft.; Kumaon, *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, *J. D. H.*

Leaves 4 by 1$\frac{2}{3}$ in. *Sepals* sometimes nearly free, narrowly lanceolate, sometimes united half-way.—Scarcely separable from *Æ. grandiflora* var. *parasitica*, but has broader leaves, and comes from a different area.

6. **Æ. maculata,** *Lindl. Bot. Reg.* 1841, t. 28; glabrous except the corolla, leaves lanceolate, pedicels clustered, calyx $\frac{1}{4}$ in. lobes lanceolate acute, corolla $\frac{3}{4}$ in. narrow. *DC. Prodr.* ix. 261. Æ. parasitica, *Wall. Cat.* 796, *partly*.—Æschynanthus sp. n. 15, *Herb. Ind. Or. H.f. & T.*

TEMPERATE HIMALAYA, alt. 2–7000 ft., from Nepal to Bhotan, frequent; Lachoong Valley, alt. 8000 ft., *J. D. H.*

Leaves 4 by 1$\frac{1}{4}$ in. *Pedicels* often numerous, sometimes $\frac{1}{2}$ in., sometimes capitate. *Calyx* (in the typical plant) deeply divided, tube wide subcampanulate, lobes lanceolate; in *H.f. & T.* n. 15, calyx-tube narrow-cylindric teeth sublinear as long as the tube. *Anthers* (in the typical plant) far exserted; in all the numerous examples of *H.f. & T.* very shortly exserted.—Hardly distinguishable from *Æ. ramosissima*, but by the small calyx.

VAR. *stenophylla*; leaves linear, calyx $\frac{1}{6}$–$\frac{1}{4}$ in. deeply divided, often pubescent, lobes linear-subulate. Æschynanthus sp. n. 18, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 0–4000 ft., frequent; *H.f. & T.*, &c. Chittagong, alt. 0–1000 ft., *H.f. & T.*

7. **Æ. Griffithii,** *Br. in Pl. Jav. Rar.* 115; glabrous, leaves lanceolate, sepals narrowly linear-lanceolate, corolla $\frac{3}{4}$ in. glabrous without. *DC. Prodr.* ix. 261. Æ. radicans, *Wall. Cat.* 798 *partly, not of Jack.*—Æschynanthi sp., *Griff. Notul.* iv. 156, *as to descr. of t.* 441 ?; *certainly not Griff. Ic. Pl. Ind. Or.* t. 441.

INDIA (probably Mergui), *Griffith*; Tavoy, *Wallich.*

Stem somewhat slender, elongate, branching, rooting at the nodes, terete. *Leaves* 3 by $\frac{3}{4}$ in., acuminate, base cuneate, fleshy, midrib beneath scarcely dilated; petiole $\frac{1}{6}$ in. *Pedicels* 1–2 together, terminal and axillary, $\frac{1}{4}$ in. *Calyx* divided nearly to the base; lobes $\frac{1}{3}$ by $\frac{1}{12}$ in. *Corolla* somewhat curved; lobes $\frac{1}{8}$–$\frac{1}{6}$ in., rounded black purple-marked. *Filaments* far exserted, minutely glandular-hairy. *Seeds* not seen.—Examples imperfect; the species is certainly distinct if, as Brown says, "semina extremitate superiore ditricha;" but it exceedingly resembles *Æ. longicaulis*, Wall., from the same place.

Sect. 3. **Haplotrichium.** *Seeds* with one hair not dilated at its base near the hilum, and one at the apex. *Calyx* deeply divided.

* *Calyx-lobes small, lanceolate, acute, or linear.*

8. **Æ. Perrottetii,** *A. DC. Prodr.* ix. 261, *not of Wight nor of Gardn.*;

glabrous except the corolla, leaves lanceolate base rhomboid or rounded, umbels 2–6-fld., corolla $1\frac{1}{3}$ in. *Jerdon Ic. Ined., Kew.*

BOMBAY (probably in the Ghats of Malabar); *Dalzell, Stocks.* NILGHERRY MTS.; *Clarke.*

Branches not or scarcely compressed. *Leaves* 3 by $\frac{3}{4}$ in., acuminate, subcoriaceous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Pedicels* $\frac{1}{12}$–$\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* elongate, narrow, pubescent or subglabrate without, scarlet purple-marked in the lobes. *Filaments* exserted, minutely glandular-hairy. *Capsule* 5 in.

VAR. *malabarica*; leaves attenuate at the base, sepals $\frac{1}{8}$–$\frac{1}{6}$ in.—Mts. of W. Deccan Peninsula, from Panoar Ghaut near Bombay to Courtallum, frequent.

VAR. *Æ. platyculmis*; branchlets much flattened, leaves dense bifarious broad-lanceolate or elliptic, corolla $1\frac{1}{2}$ in. Æ. ceylanica, *Wight Ic.* t. 1347, *not of Gardn.*—Madras; Courtallum, *Wight*; Nilghiri and Kurg Mts., *G. Thomson.* Bombay (probably in the W. Ghauts), *Stocks. Branchlets* with subacute edges, probably closely applied to the branches of trees. *Leaves* $2\frac{1}{3}$ by 1 in., acute at both ends; petiole $\frac{1}{3}$ in., nearly $\frac{1}{6}$ in. broad. *Flowers* and *capsules* nearly as in *C. Perrottetii.*

9. **Æ. ceylanica,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 474; glabrous except the corolla, leaves narrowly lanceolate, umbels usually 2-fld., corolla 1 in., capsule 5 in. *Thwaites Enum.* 206, *excl. syn.*

CEYLON; *Gardner, Thwaites* (C. P. n. 1782, &c.).

Branches not or scarcely compressed. *Leaves* scattered, $3\frac{1}{2}$ by $\frac{1}{2}$ in. (in Gardner's example sometimes wider); petiole $\frac{1}{8}$ in. *Pedicels* very generally 2 terminal, 2–4 in Gardner's example. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* pubescent or subglabrous.—Differs from *Æ. Perrottetii* by the considerably shorter corolla.

VAR. *pinguis*; leaves smaller succulent thick often obtuse, corolla glabrous without, capsule 2–5 in. Æ. Perrottetii, *Gardn. in Calc. Journ. Nat. Hist.* vi. 475, *not A. DC.*—Ceylon; *Wight, Walker.* Nilghiri Mts.; near Pycarah, *Wight.*

10. **Æ. micrantha,** *Clarke*; glabrous except the flowers, leaves elliptic or oblong, pedicels 1–5 together, sepals $\frac{1}{6}$–$\frac{1}{3}$ in. linear pubescent, corolla $\frac{3}{4}$ in. narrow. Æ. parviflora, *Clarke Comm. & Cyrt. Beng.* t. 47, *not of G. Don.* Æ. parasitica, *Wall. Cat.* 796, *partly.*

SUBTROPICAL HIMALAYA, alt. 2000 ft.; *J. D. H.*, &c. ASSAM; *Wallich, Griffith.* KHASIA MTS., alt. 4000 ft.; Churra, *H. f. & T.*, &c.

Branches somewhat slender, elongate, often rooting, divided, glabrous, not compressed. *Leaves* $2\frac{1}{3}$ by 1 in., sometimes smaller, shortly acuminate, base cuneate, coriaceous; petiole $\frac{1}{3}$ in. *Pedicels* $\frac{1}{12}$–$\frac{1}{2}$ in., terminal, and on lateral spurs, glabrous or early glabrate. *Sepals* laxly sparsely villous, ultimately glabrate. *Corolla* red, mouth orange, lobes purple-marked. *Filaments* far exserted, minutely glandular-hairy. *Capsule* 6 in.—Much resembles *Æ. maculata*, and confused with it, but the seeds are altogether different; in the absence of seeds, *Æ. micrantha* may generally be recognized by the creeping rooting branches and smaller leaves.

11. **Æ. gracilis,** *Parish; Clarke Comm. & Cyrt. Beng.* t. 48, *lower fig.*; branches slender, leaves small broad-lanceolate hairy, flowers scattered subsolitary, corolla 1 in. mouth very oblique. Æschynanthus sp. n. 13, *Herb. Ind. Or. H. f. & T.*—Cyrtandracea, *Griff. Ic. Pl. Ind. Or.* t. 429, fig. 1, and *Notul.* iv. 160.

SUBTROPICAL E. HIMALAYA, alt. 1–4000 ft., frequent; Sikkim and Bhotan, *J. D. H.*, &c. ASSAM; *Griffith.* KHASIA MTS., alt. 4000 ft., *H. f. & T.* CACHAR; *Keenan* BURMA; Moulmein, *Parish*; Mergui, *Griffith.*—DISTRIB. Ava.

Branches elongate, rooting, fulvous or reddish with spreading hairs. *Leaves* $\frac{1}{2}$ by $\frac{1}{3}$ in., base cuneate or rounded; petiole $\frac{1}{12}$ in. *Pedicels* $\frac{1}{10}$–$\frac{1}{3}$ in., solitary, rarely paired, pilose. *Sepals* $\frac{1}{8}$ in., linear, somewhat villous. *Corolla* villous without, scarlet, mouth orange black-marked, deeply 2-lipped, segments of lower lip with reflexed margins. *Filaments* shortly exserted, minutely glandular-hairy. *Capsule* 2–3 in.

12. **Æ. chiritoides,** *Clarke*; branches slender, leaves opposite and ternate small broad-lanceolate hairy, flowers 1–3 together terminal, corolla $1\frac{1}{4}$ in. straight, lobes short subequal.

BHOTAN; *Nuttall.* ASSAM; *Griffith.* ? KHASIA MTS., alt. 4000 ft., *H. f. & T.*
Stems and *leaves* closely resembling those of *Æ. gracilis*, but the leaves are not rarely ternate. *Pedicels* $\frac{1}{12}$–$\frac{1}{4}$ in., villous. *Sepals* $\frac{1}{6}$–$\frac{1}{3}$ in., linear, villous. *Corolla* narrow-tubular below, suddenly expanding into a tubular upper portion $\frac{1}{3}$ in diam., minutely pilose; lobes $\frac{1}{4}$ in., round-ovate, black-marked. *Filaments* included, glabrous. *Ovary* villous.—A most remarkable species, the corolla, both in shape and texture, resembling a *Chirita.* The example of H. f. & T. shows leaves only, so that it cannot be confidently referred anywhere.

13. **Æ. levipes,** *Clarke*; branches very slender, leaves small opposite and ternate, narrow-lanceolate hairy, flowers solitary terminal, pedicels smooth, corolla $1\frac{1}{4}$ in.

UPPER ASSAM; Mishmee, on Mt. Laim-planj, *Griffith* (Kew Distrib. n. 3815).
Somewhat densely clothed with white or greyish hair on every part except the pedicels. *Branches* elongate, sparingly rooting. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., subsessile. *Pedicels* $\frac{1}{3}$ in., glabrous even when young. *Sepals* $\frac{1}{4}$ in., linear, flat, thinly herbaceous, sparsely villous. *Corolla* (imperfectly preserved) appears nearly as of *Æ. chiritoides*, but narrower.

14. **Æ. Mannii,** *Kurz ms.*; branches somewhat thick pubescent upwards, leaves small elliptic early glabrate, pedicels axillary subsolitary, corolla $\frac{3}{4}$ in. narrow, mouth subequal.—Cyrtandracea, *Griff. Ic. Pl. Ind. Or.* t. 429, fig. 2, and *Notul.* iv. 159.

KHASIA MTS.; *Mann.* S.E. ASSAM; Patkoye Mts., *Griffith* (Kew Distrib. n. 3816).
Stem short; branches several, 2–10 in., undivided, terete, soon glabrate. *Leaves* densely approximated, $1\frac{1}{4}$ by $\frac{1}{2}$ in., subobtuse at both ends, coriaceous, young hairy, mature dotted; midrib prominent beneath; petiole $\frac{1}{20}$ in. *Pedicels* 0–$\frac{1}{3}$ in., villous. *Sepals* $\frac{1}{3}$ in., villous. *Corolla* narrowly tubular-funnel-shaped, curved upwards, pubescent without; lobes $\frac{1}{6}$–$\frac{1}{5}$ in. diam., roundish, black-marked. *Filaments* far exserted, glandular-hairy.—Allied to *Æ. Andersoni* (Clarke Comm. & Cyrt. Beng. t. 48, upper fig.), which has hairy leaves attenuated to the petiole: as to the inflorescence, the pedicels of *Æ. Mannii* are often approximated towards the ends of the branches, but they are shorter than those of *Æ. Andersoni.*

15. **Æ. Masoniæ,** *Kurz. ms.*; branches somewhat thick pubescent upwards, leaves small elliptic base rounded glabrous, pedicels axillary subsolitary, corolla $\frac{1}{2}$ in. slender, mouth narrow subequal.

PEGU; hills of the Red Karens, *Mrs. Mason.*
Branches several, 5–10 in., undivided, terete, early glabrate. *Leaves* (in the solitary example) subsessile, ternate, $\frac{3}{4}$–1 by $\frac{1}{2}$ in., cuneate, widest near the base; midrib prominent beneath. *Corolla* pubescent without; mouth scarcely $\frac{1}{5}$ in. diam.—Very nearly allied to *Æ. Mannii*; the shape of the leaves is different, and the corolla considerably smaller.

** *Calyx-lobes wide, obtuse, or large (bracts prominent).*

16. **Æ. acuminata,** *Wall. Cat.* 6397; glabrous, leaves largeish elliptic acuminate, peduncles subfasciculate 1- or few-fld., calyx deeply divided, lobes $\frac{1}{6}$ in. round, corolla $\frac{1}{2}$ in. yellow-green. *A. DC. Prodr.* ix. 263; *Clarke Comm. & Cyrt. Beng.* t. 45. Æ. bracteata, *Benth. Fl. Hongk.* 258, *not of Wall.* Æ. chinensis, *Gard. & Champ. in Hook. Kew Journ.* i. (1849), 328. —Cyrtandracea, *Griff. Itin. Notes,* 78, n. 1151.

SUBTROPICAL EASTERN HIMALAYA, alt. 1–3000 ft.; Sikkim, Bhotan and Upper Assam, frequent, *H. f. & T.*, &c. KHASIA and JAINTEA MTS., alt. 500–3000 ft.; *Wallich*, &c. CACHAR; *Keenan*.—DISTRIB. Hongkong.

Branches long, divided, terete. *Leaves* 3½–4 by 1¼ in., acuminate, base cuneate; petiole ½ in. *Peduncles* 3–7 together, approximate or clustered towards the ends of the branches, ⅓–1½ in., 1–4 fld.; bracteoles at the forks 2, ¼ in. diam., broadly ovate; pedicels ⅔ in. *Calyx* wide at the base, green; lobes persistent, ultimately reflexed. *Corolla* wide-tubular, straight; upper lip erect, green; lower pendent, yellow, sometimes reddish on the margin without. *Filaments* far exserted, minutely glandular-hairy. *Capsule* 6 in.—The Hongkong plant has narrower leaves than the Khasian. Bentham never proposed to unite *Æ. acuminata*, Wall., to *Æ. bracteata*, Wall.; but to refer to the latter certain specimens which had been wrongfully mixed up with those of *Æ. acuminata.*

17. **Æ. bracteata,** *Wall. Cat.* 794; glabrous, leaves largeish elliptic acuminate fleshy, peduncles 1- or several-fld., calyx-lobes ⅔ in. lanceolate red, corolla 1⅓ in. scarlet. *DC. Prodr.* ix. 261; *Clarke Comm. & Cyrt. Beng.* tt. 43, 44. Æ. Paxtoni, *Lindl. in Journ. Hort. Soc.* iv. 79, *with fig.* Æ. Peelii, *Hook. f. Ill. Himal. Pl.* t. 17.—Æschynanthi sp., *Griff. Ic. Pl. Ind. Or.* t. 432, and *Notul.* iv. 156. Æschynanthoidea, *Griff. Itin. Notes*, 28, n. 429. Cyrtandracea, *Griff. Itin. Notes*, 25, n. 388.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; Sikkim and Bhotan, *Griffith, J. D. H.*, &c. UPPER ASSAM; *Mrs. Mack.* KHASIA MTS., alt. 2–5000 ft., common; *Wallich, Griffith, H. f. & T.*, &c.—DISTRIB. Ava.

Epiphytic; branches long, terete. *Leaves* 4 by 1½ in., from subrotund to narrow-lanceolate, base cuneate or rounded; petiole ½ in. *Peduncles* mostly terminal, often opposite, 1 in., 1–7-fld.; bracts 1 in., elliptic-lanceolate scarlet as are the pedicels and calyces. *Sepals* nearly free, deciduous. *Corolla* nearly glabrous without, lower lip with reflexed lobes. *Filaments* exserted, minutely glandular-hairy. *Capsule* 4–6 in.

18. **Æ. Kingii,** *Clarke*; glabrous, leaves large long elliptic herbaceous, peduncles 3–7-fld., calyx-lobes ½ in. lanceolate caudate-acuminate green.

SIKKIM; alt. 6000 ft., *King.*

Leaves 7½ by 3 in., base broadly rhomboid; nerves 7–8 pair. *Peduncles* 3-nate, 2–2½ in.; bracts caducous. *Calyx* persistent in young fruit, base shortly funnel-shaped, membranous. *Corolla* not seen. *Seeds* with one hair at each end.—Seems nearly allied to *Æ. bracteata*, but the texture is very unlike.

19. **Æ. superba,** *Clarke Comm. & Cyrt. Beng.* t. 46; glabrous, leaves large oblong acuminate, umbels dense few-fld., sepals 1 in. broad-oblong obtuse, corolla 2¼ in. rose-red. Æ. longiflora, *Wall. Cat.* n. 795, *not of Blume.*—Æschynanthus sp. n. 4, *Herb. Ind. Or. H. f. & T.* Cyrtandracea, *Griff. Ic. Pl. Ind. Or.* t. 431, and *Notul.* iv. 160, and *Itin. Notes*, 43, n. 677.

KHASIA MTS., alt. 1500-4000 ft., frequent; *Wallich, Griffith, H. f. & T.*, &c. ASSAM; *Mrs. Mack.*

Stems several fathoms long, branched, scrambling among rocks. *Leaves* 6 by 2 in., base cuneate or rounded; petiole ¼ in. *Peduncles* 1 in., terminal and on short axillary spurs, stout; bracts ⅔–2 in., ovate-oblong, deciduous, rose-red as is the whole inflorescence; pedicels 1–6, 0–¾ in., subumbelled. *Sepals* thin, deciduous. *Corolla* tubular, curved, mouth slightly oblique. *Filaments* exserted, minutely glandular-hairy. *Capsule* 12–16 in.

Sect. 4. **Holocalyx**. Seed with an apophysis of hyaline large cells and one hair at the hilum, and one hair at the apex. *Calyx* not deeply lobed.—[Peduncles short, 2-fld., axillary and terminal, often crowded near

the ends of the branches, at length clavate; bracts 2, small, ovate, deciduous; pedicels longer than the peduncles. Corolla-lobes ovate, obtuse; 2 upper erect, connate; 3 lower reflexed. Filaments glabrous; ovary and style densely glandular-hairy. Flowers (at least in several species), dimorphic, some with the stigma low down in the corolla-tube, others with the stigma exserted; stamens in both about as long as the corolla.]

* *Calyx tubular, longer than broad.*

20. **Æ. radicans,** *Jack in Trans. Linn. Soc.* xiv. 43, *not of Wall.*; stem thinly hairy, leaves small ovate or oblong thinly hairy or glabrate beneath, calyx $\frac{1}{2}$ in. hairy, corolla $2\frac{1}{2}$ in. hairy without. *DC. Prodr.* ix. 262. Trichosporum radicans, *Nees in Flora*, 1825, 144; *Blume Bijd.* 764.

MALACCA; *Griffith.*—DISTRIB. From Sumatra to the Philippines.

Stem slender, branching, rooting, hairs spreading fulvous deciduous. *Leaves* 1 by $\frac{2}{3}$ in. ovate, or 2 by $\frac{2}{3}$ in. on the same branch; petiole $\frac{1}{4}$ in. *Peduncles* 0–$\frac{1}{6}$ in. pedicels $\frac{1}{5}$–$\frac{1}{2}$ in., villous. *Calyx* subcylindric, somewhat densely covered with spreading, white, multicellular hairs; teeth scarcely $\frac{1}{12}$ in., broadly triangular. *Corolla* scarlet, throat yellow. *Capsule* 5–8 in.

21. **Æ. Lobbiana,** *Hook. Bot. Mag.* t. 4260; leaves small elliptic-oblong glabrous, calyx $\frac{3}{4}$ in. deep purple with white hairs, corolla 2 in. pubescent without.

MALACCA; *Maingay* (Kew Distrib. nn. 1218, 1219).—DISTRIB. Java, Borneo.

Branches pendent, glabrous. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., scarcely acute, base rounded, when fresh minutely ciliate, dry glabrous; petiole $\frac{1}{5}$ in., obscurely pilose or glabrous. *Peduncles* axillary and clustered at the ends of the branches, recurved. *Calyx* tubular, scarcely $\frac{1}{3}$ in. diam. upwards, densely covered with spreading glistening hairs; teeth very shallow. *Corolla* scarlet, throat yellow.

** *Calyx obconic broader than long.*

22. **Æ. Wallichii,** *Br. in Benn. Pl. Jav. Rar.* 116; leaves elliptic acuminate or lanceolate glabrous, calyx broadly cup-shaped subentire, corolla 1 in. villous without. Æ. radicans, *Wall. Cat.* 798, *type sheet only, not of Jack.*—Æschynanthus sp. n. 16, *Herb. Ind. Or. H. f. & T.*

SINGAPORE; *Wallich.* MALACCA; Mt. Ophir, *Lobb.*—DISTRIB. Sumatra.

Stems long, branched, terete, glabrous. *Leaves* 4 by $1\frac{1}{4}$ in., base cuneate or suddenly narrowed, coriaceous; petiole $\frac{1}{4}$ in. *Peduncles* 0–$\frac{1}{6}$ in.; pedicels $\frac{1}{5}$–$\frac{2}{3}$ in., sparsely hairy. *Calyx-mouth* $\frac{1}{4}$–$\frac{1}{3}$ in. wide, margin patent. *Corolla* probably crimson. *Capsule* 6 in.

23. **Æ. obconica,** *Clarke*; leaves broadly elliptic narrowed at both ends glabrous, calyx very large obconic hairy subentire, corolla $\frac{3}{4}$ in. villous without.

Peninsula of MALACCA; at Klang in Selangore, *Beccari.*

Calyx $\frac{1}{2}$ in. and upwards in length, otherwise very like *Æ. Wallichii*, in which the corolla is thrice as long as the calyx, whereas in *Æ. obconica* the corolla is much less than twice the calyx.

II. **LYSIONOTUS,** *D. Don.*

Glabrous, epiphytic shrubs. *Leaves* opposite, or ternate, similar. *Cymes* peduncled, many-fld., lax; bracts herbaceous, inconspicuous; bracteoles small. *Sepals* narrowly lanceolate. *Corolla* tubular, inflated at

the middle, straight, 2-lipped; lower lip with 2 folds within. *Stamens* 2 perfect (2 or 3 rudimentary), subincluded; filaments flattened, bent; anthers connivent, connective with an oblong process. *Disc* annular. *Ovary* superior, stipitate, linear; style as long as the stamens, stigma shortly 2-lobed; placentæ deeply inflexed, then recurved and ovuliferous. *Capsule* linear, in the following year splitting loculicidally to the base into 2 (ultimately 2-partite) valves. *Seeds* small, oblong, smooth, with a hair at the apex, pendent by a funicle which when detached resembles the apical hair.—Species 3, in N. India, China and Japan.

1. **L. serrata,** *D. Don in Edinb. Phil. Journ.* vii. 85, and *Prodr.* 124; leaves elliptic acuminate crenate-serrate or lanceolate herbaceous sinuate, sepals narrowly lanceolate thin. *Bot. Mag.* t. 6538. L. ternifolia, *Wall. Pl. As. Rar.* ii. 20, t. 118; *A. DC. Prodr.* ix. 264; *Clarke Comm. & Cyrt. Beng.* t. 52. Calosacme polycarpa, *Wall. Cat.* 804.

SUBTROPICAL HIMALAYA, alt. 2–7000 ft.; from Kumaon to Bhotan, common, *Wallich*, &c. ASSAM and KHASIA MTS., alt. 1–4000 ft., common.

Stem 12 in., branched. *Leaves* often ternate, 6 by 2 in., from narrow-lanceolate to elliptic, closely serrate nearly to the base or sinuate; nerves prominent, oblique; petiole $\frac{1}{3}$ in. *Peduncles* often 4 in.; bracts $\frac{1}{3}$ in., ovate; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., in young fruit often enlarged $\frac{1}{3}$–$\frac{1}{2}$ in. and somewhat connate at the base. *Corolla* 1 in., deep purple or paler, or white with purplish veins. *Capsule* 2–4 in.

2. **L. conferta,** *Clarke*; branches long, leaves elliptic acuminate subentire very coriaceous. Æschynanthus conferta, *Griff. Priv. Journ.* p. 63, *name only.*

S.E. ASSAM; Patkoye Mts., *Griffith* (Kew Distrib. n. 3819).

Branches 18 in. and more, straight, undivided. *Leaves* ternate, entire, minutely crenate towards the apex; nerves obscure, at right angles to the midrib. *Peduncles* and *capsules* nearly as of *L. serrata*; remains of the calyx somewhat coriaceous. *Flowers* not seen.—This may be a var. of *L. serrata*, but no form of this is known with similarly elongate branches and coriaceous leaves.

III. **LOXOSTIGMA,** *Clarke.*

An undershrub, often rooting near the base; branches long. *Leaves* opposite, often unequal, serrate, pilose. *Cymes* peduncled, lax, many-fld.; bracts and bracteoles small. *Sepals* 5, lanceolate. *Corolla* tubular, inflated above the base, straight, yellow; lobes 5, spreading. *Stamens* 4, didynamous, included; anthers 2-celled, connivent in pairs; connective not excurrent; cells elliptic, subparallel. *Ovary* shortly stalked, linear, glabrous; stigma unilateral, obscurely bifid; placentæ deeply inflexed, bifid, revolute. *Capsule* linear, loculicidal for its whole length; placentæ revolute covering the seeds. *Seeds* pendulous, funicle capillary with a single hair at the apex.

L. Griffithii, *Clarke*; leaves elliptic subfalcate acuminate serrate, sepals oblong acute green sometimes denticulate. Didymocarpus Griffithii, *Wight Ill.* ii. 182, t. 159, *bad.* Dichrotrichum Griffithii, *Clarke Comm. & Cyrt. Beng.* t. 51. Chirita Griffithii, *Herb. Ind. Or. H.f. & T.*

SUBTROPICAL HIMALAYA, alt. 3–6000 ft.; from Sikkim to Mishmee, frequent, *Griffith, Hook. f.*, &c. KHASIA MTS., alt. 2–4000 ft., *Griffith, H.f. & T.*

Thinly pubescent. *Leaves* opposite, often unequal, 7 by 3 in., base acute or unequally rhomboid; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in., often unequal. *Peduncles* 2–4 in.; bracts $\frac{1}{4}$ in., narrow; pedicels $\frac{1}{4}$–1 in. *Sepals* $\frac{1}{4}$ in. *Corolla* $1\frac{1}{4}$ by $\frac{1}{3}$ in., minutely hairy. *Anthers* conni-

vent in pairs, connective not appendaged. *Style* subpersistent. *Capsule* 2½–5 in.—Wight's example of this was from Griffith in early flower; in his picture cited he guessed the colour of the flower wrong, and added a figure of a seed of some species (probably) of Didymocarpus; the figure thus concocted has defied identification until Griffith's specimen in Wight's Herbarium was found.

IV. **DIDYMOCARPUS,** *Wall.*

Stemless or erect herbs. *Leaves* opposite, alternate, 3–4-nate or crowded. *Peduncles* axillary, many- or few-fld.; bracts rarely conspicuous; pedicels cymose, subumbelled or subracemed in pairs. *Calyx* small, 5-fid or nearly -partite. *Corolla-tube* cylindric or ovoid, mouth oblique or subsymmetric; lobes 5, rounded. *Stamens*, 2 perfect, 2–3 rudimentary; filaments glabrous, bent; anthers cohering in pairs; cells 2, ovate, early confluent. *Disc* cylindric or 0. *Ovary* stalked or sessile, narrow; style long or short, stigma peltate emarginate or unilateral oblong rarely 2-lobed; placentæ deeply inflexed, then recurved bearing ovules. *Capsule* linear, rarely lanceolate, loculicidally 2-valved or subfollicular, ultimately usually 2- often 4-valved; valves not twisted before dehiscence; placentæ on the valves, revolute, concealing the seeds. *Seeds* ellipsoid, small, smooth, minutely reticulate.—Distrib. Species 70, in India, Malaya and S. China, 1 in Madagascar.

Sect. 1. **Monophylloides.** Plant very small, 1-leaved.

1. **D. pygmæa,** *Clarke*; leaf sessile elliptic base cordate, pedicels few short fascicled in its axil.

Central India; Rewah, *Vicary.* Chota Nagpore; Lohardugga, *Clarke.*
Pubescent. *Stem* ⅙–2 in., slender, curved, bearing one leaf at its apex. *Leaf* (one cotyledon persistent ?) 1 by ⅝ in. or much smaller, falcate, obtuse at both ends, sinuate scarcely crenate, thin; petiole 0 rarely $\frac{1}{20}$ in. *Pedicels* ¼ in.; bracts inconspicuous or 0. *Sepals* $\frac{1}{10}$ in., linear, somewhat enlarged in fruit. *Corolla* ¼ in., tubular. *Stamens* 2 fertile, 2 linear rudiments, glabrous; anther-cells 2, ovate, oblique, scarcely confluent by their tips. *Ovary* and style villous; stigma small, subcapitate, scarcely 2-lobed. *Capsule* ½–⅝ in., nearly straight; 2-valved, and seeds altogether as in *Didymocarpus.*

Sect. 2. **Eudidymocarpus** (*Benth. in Gen. Pl.* ii. 1022). *Cymes* many-fld., subcorymbose. *Calyx* 5-lobed, or in *D. Mortoni* nearly 5-partite. *Corolla-tube* cylindric.—Species confined to N. and N.E. India.

2. **D. pedicellata,** *Br. in Benn. Pl. Jav. Rar.* 118; stem hardly any, leaves roundly ovate glabrous glandular-punctate above, calyx divided one-third the way down lobes rounded, capsule 1–1¼ in. long-pedicelled. *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 64. D. macrophylla, *Wall. Cat.* 784, *partly*; *Royle Ill.* 294, t. 70, fig. 1.

Subtropical W. Himalaya; from Chumba to Kumaon, alt. 2500–5500 ft., frequent, *Wallich, Royle, Falconer,* &c.
Stem usually 0, sometimes 1½ in. with 2 or 3 pairs of opposite cauline leaves, glabrous; innovations scabrous-puberulous. *Leaves* usually all radical, 3–6 in. diam., crenate-serrate, the points on their upper surface conspicuous black, in age colourless obscure without a lens; petiole 2–5 in. *Scapes* 4 in.; flowers often very many; bracts ¼ in., ovate, often shortly connate. *Calyx* ¼ in., funnel-shaped. *Corolla* nearly 1 in., purple. *Capsule-stalk* ¼–⅓ in., filiform.

3. **D. macrophylla,** *Wall.*; *Don Prodr.* 122; stemless, leaves ovate

softly hairy above glabrate beneath, calyx divided one-third the way down lobes obtuse, capsule nearly 1 in. sessile. *Wall. Cat.* 784, *chiefly*; *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 63, *not of Royle.* D. aromatica, *Wall. Pl. As. Rar.* t. 141, fig. 4–7, *only*; *Clarke Comm. & Cyrt. Beng.* t. 59, *as to the fruiting plant only*; *not of others.* D. plicata, *Don Prodr.* 122. Henckelia macrophylla & plicata, *Spreng. Syst., curæ post.* 13, 14.

NEPAL; *Wallich.*

Leaves all radical, 3–6 in. diam., crenate-serrate; petiole 2–5 in., hairy at the base. *Scapes* 4 in., early glabrate; bracts $\frac{1}{4}$ in., ovate. *Calyx* $\frac{1}{4}$ in., funnel-shaped. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., deep purple. *Ovary* covered with minute sessile glands. *Capsule* narrowed at its base for $\frac{1}{25}$ in. only.—In ripe fruit the scape is glabrous, the two young leaves at its base are densely villous.

4. **D. cinerea,** *Don Prodr.* 122; stem short or 0, leaves ovate-cordate ashy-pubescent above, calyx divided a third of the way down lobes ovate, capsule $1\frac{1}{2}$ in. pedicelled. D. obtusa, *Wall. Cat.* 786; *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 61. Henckelia cinerea, *Spreng. Syst., curæ post.* 14.—Didymocarpus sp. n. 19, *Herb. Ind. Or. H.f. & T.*

NEPAL, *Wallich*; near River Tambur, *J. D. H.*

Stem none, or $1\frac{1}{2}$ in., ashy-pubescent. *Leaves* radical or opposite, 2–$3\frac{1}{2}$ in. diam., obtuse, crenate, glabrate beneath, nerves pubescent; petiole 4–8 in. *Peduncles* $\frac{1}{2}$–2 in.; shorter (cymes included) than the leaves, pubescent, later hardly glabrate; bracts $\frac{1}{4}$ in., ovate, ashy-pubescent on both surfaces. *Calyx* $\frac{1}{3}$ in., subcampanulate, sparsely pubescent; teeth obtuse or mucronulate. *Corolla* nearly 1 in., purple paler downwards, sparsely villous or glabrous.

5. **D. Andersoni,** *Clarke Comm. & Cyrt. Beng.* t. 62; stem short 2–4-leaved, leaves ovate-cordate hairy above and on the nerves beneath, flowers capitellate subincluded within purple connate bracts, calyx-lobes very short obtuse, capsule 1 in. sessile.

SIKKIM; alt. 7–9000 ft., *J. D. H.* Kursiong, alt. 4500 ft., *Anderson,* &c.

Stem $\frac{1}{2}$–$1\frac{1}{2}$ in., patently villous, at flower-time leafless at the base, with 2 large and usually 2 small leaves at its apex. *Leaves* opposite 6 by 4 in., coarsely crenate-serrate; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Peduncles* 3–7 in., villous; bracts $\frac{1}{3}$ in., obovate and with the whole cyme dark purple-red; pedicels very short, concealed by the bracts. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., funnel-shaped, glabrous, divided scarcely $\frac{1}{4}$ the way down. *Corolla* more than 1 in., fine rose-purple, tube very narrow, mouth 1 in. diam. *Ovary* glabrous. *Capsule* very acute.

6. **D. aurantiaca,** *Clarke Comm. & Cyrt. Beng.* t. 60; stem short 2–4-leaved, leaves ovate villous above, flowers pedicelled orange-red, calyx divided nearly half-way down, capsule $1\frac{3}{4}$ in. pedicelled.

NEPAL; *Wallich.* SIKKIM, alt. 2–4000 ft., *Herb. Griffith, Anderson,* &c.

Stem $\frac{1}{2}$–$2\frac{1}{2}$ in., villous. *Leaves* opposite, 3–6 in., acute or obtuse, usually cordate, serrate, beneath glabrous with villous nerves; petiole $\frac{3}{4}$–$2\frac{1}{2}$ in. *Peduncles* 4 in., hairy, ultimately scarcely glabrous; bracts $\frac{1}{8}$ in., ovate, scarcely connate; pedicels often 1 in. *Calyx* $\frac{1}{6}$ in., campanulate, more or less purple, glandular-viscid or nearly glabrous. *Corolla* $1\frac{1}{4}$ in., long funnel-shaped. *Ovary* glabrous. *Capsule-stalk* $\frac{1}{4}$ in., linear.

7. **D. oblonga,** *Wall. in Don Prodr.* 123; stem often 4-leaved at the apex, leaves oblong or elliptic coarsely crenate pilose, petioles patently villous, cyme glabrous, calyx divided one-third way down lobes rounded, capsule $\frac{1}{2}$ in. subsessile. *Wall. Pl. As. Rar.* ii. 34, t. 140; *DC. Prodr.* ix. 266;

Clarke Comm. & Cyrt. Beng. t. 56. D. verticillata, *Wall. Cat.* 783. Henckelia oblonga, *Spreng. Syst. curæ post.* 13.

NEPAL; *Wallich.* SIKKIM; Lachen, alt. 7–11,000 ft., and Sinchul, alt. 8500 ft., *J. D. H.*

Stem 2–5 in., villous-pubescent, at flower-time with 4 subverticillate leaves at its apex otherwise leafless; or elongate with 3 or 4 remote nodes, opposite leaves, and both axillary and terminal peduncles. *Leaves* opposite, 4 by 1½ in., subobtuse, closely villous above, glabrous beneath with villous nerves; petiole ⅛–2½ in., patently villous. *Peduncles* 2 in., glandular-pilose, glabrate upwards; bracts ⅛ in., broad, connate, glabrous, coloured, subpersistent. *Calyx* ⅛ in., campanulate. *Corolla* ⅜ in., dark purple.—Recognized by its small capsule.

8. **D. villosa,** *Don Prodr.* 123; stem 4-leaved at the apex very villous, leaves ovate or obovate obtuse crenate closely silky-villous above, cymes glabrous, calyx divided less than half-way down lobes obtuse, capsule nearly ⅔ in. sessile. *DC. Prodr.* ix. 266, *not of Clarke.* Henckelia villosa, *Spreng. Syst. curæ post.* 13.

NEPAL; *Wallich.*

Stem 2–6 in., densely covered with long spreading hairs, leafless except at the apex. *Leaves* opposite, 2 by 1½ in., beneath villous or nearly glabrous on the lamina; petiole 0–½ in., patently villous. *Peduncles* 1–3 in.; bracts ⅛ in., ovate, connate, coloured, glabrous; pedicels ⅓ in. *Calyx* ⅙ in., campanulate, glabrous. *Corolla* ½ in. or rather more (apparently black-purple).—Seems very near *D. aromatica,* Wall., which has not the densely woolly stem.

9. **D. aromatica,** *Wall. Cat.* 785 *chiefly, Pl. As. Rar.* ii. 44, t. 141, *excl. fig.* 4–7; stem 4-leaved at the apex, leaves ovate or elliptic crenate softly hairy above, lower bracts herbaceous more or less pubescent, cyme glabrous, calyx divided one-third way down lobes rounded, capsule ⅔ in. sessile. *Clarke Comm. & Cyrt. Beng.* t. 59, *excl. fruiting plant; not of D. Don*; *DC. Prodr.* ix. 267, *partly.* D. primulifolia, *Don Prodr.* 123, *partly.* Henckelia primulifolia, *Spreng. Syst., curæ post.* 14, *partly.*

NEPAL; *Wallich.*

Stem 4–6 in., pilose, leafless except at the apex. *Leaves* opposite, 4 by 2¼ in., densely softly strigose on both surfaces or glabrate between the nerves beneath; petiole unequal, ¼–2 in. *Inflorescence* shorter than the leaves; peduncles (usually 2) 1–2 in.; lower bracts ⅙ in., ovate, green, not connate, often denticulate, deciduous; cymes upwards with the pedicels and calyces glabrous. *Calyx* ⅙ in., campanulate. *Corolla* ⅝ in., purple, nearly glabrous. *Capsule-stalk* hardly $\frac{1}{18}$ in.—Don confused *D. aromatica,* Wall., with *D. subalternans,* Wall., and described his *D. primulifolia* from both; Brown therefore (in Benn. Pl. Jav. Rar. p. 118) rejected the name *D. primulifolia.*

10. **D. podocarpa,** *Clarke*; stem 4-leaved at the apex, leaves ovate or elliptic crenate minutely pilose above, bracts glabrous, calyx divided ⅓ way down lobes obtuse, capsule 1–1⅓ in. pedicelled.

SUBALPINE SIKKIM; Lachen, alt. 10–12,000 ft., *J. D. H.*; Sinchul, alt. 8000 ft., *J. D. H.*; Singalelah, alt. 8000 ft., *Treutler,* &c.

Stem 2–8 in., ashy-pubescent, leafless except at the summit. *Leaves* opposite, attaining 6 by 4 in., pubescent only on the nerves beneath; petiole 0–1 in., mostly short. *Peduncles* 2–4, 1–2¼ in.; bracts ⅓ in., wide-rotund, coloured, subconnate; pedicels ⅓–⅔ in., glabrous. *Calyx* nearly ¼ in., campanulate. *Corolla* nearly 1 in., purple, glabrous or sparsely pilose without. *Capsule-stalk* longer than, sometimes nearly twice as long as, the calyx.—Differs from the 3 preceding closely allied species by the larger flowers and larger long-pedicelled capsule.

11. **D. subalternans,** *Wall. Cat.* 782; leaves scattered and opposite

ovate or obovate crenate densely pubescent above paler subglabrous beneath, cymes irregular subumbellate viscous-pilose, pedicels short, calyx $\frac{1}{8}$ in. semi-5-fid lobes ovate-triangular, capsule 1 in. pedicelled. *DC. Prodr.* ix. 266, *not of Clarke.* D. primulifolia, *Don Prodr.* 123, *partly.* D. aromatica, *Don Prodr.* 123; *DC. Prodr.* ix. 267, *excl. all syn., not of Wall., Br., nor Clarke.*

TEMPERATE HIMALAYA; Kumaon, *Wallich*; near Gangootri, alt. 6500 ft., *Strachey & Winterbottom.* Nepal; *Wallich.*

Stem 4–12 in., nearly glabrous; nodes several. *Leaves* opposite alternate and ternate, lower long-petioled (usually alternate), uppermost sessile opposite, 3 by 2 in. *Peduncles* 1–1½ in., subumbelled; bracts $\frac{1}{6}$ in., ovate, purplish; pedicels $\frac{1}{4}$ in., sparsely viscous-pilose. *Calyx* funnel-shaped, purplish, glabrous or slightly viscous. *Corolla* $\frac{1}{2}$ in., tubular, somewhat hairy without, purple or pale-purple. *Capsule* often falcate; pedicels up to $\frac{1}{3}$ in.

VAR. *curvicapsa*; leaves larger, cymes very viscous, bracts and calyx herbaceous, capsule falcate subsessile.—Sikkim; Lachen, alt. 7–8000 ft., *J. D. H.*—Stem exceeding 1 foot. *Leaves* 4 in., glandular-pubescent. *Calyx* $\frac{1}{6}$ in., divided half-way down; lobes lanceolate, acute. *Capsule-stalk* not longer than the calyx.

12. **D. leucocalyx,** *Clarke*; leaves ovate serrate villous above, calyx small deeply divided lobes white obovate, capsule $\frac{1}{2}$ in. subsessile. D. villosa, *Clarke Comm. & Cyrt. Beng.* t. 59, *not of Don.*—Didymocarpus sp. n. 17, *Herb. Ind. Or. H.f. & T.*

SIKKIM; alt. 6000 ft., common, *Griffith, J. D. H.,* &c. NEPAL; near River Tambur, *J. D. H.*

Stem 2–6 in., hairs patent or deflexed; nodes 1–3. *Leaves* opposite, attaining 6 by 4 in., subacute, often cordate; petiole $\frac{1}{2}$–4 in. *Peduncles* 2 in., often 4, subumbelled; cyme nearly glabrous, bracts caducous leaving a villous scar. *Flowers* numerous, small. *Calyx* $\frac{1}{10}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., violet-purple. *Anthers* minutely pilose.—This plentiful Sikkim species has always been confounded with Don's *D. villosa.*

13. **D. Mortoni,** *Clarke Comm. & Cyrt. Beng.* t. 65; leaves ovate serrate villous above, calyx divided nearly to the base lobes narrowly oblong, corolla-tube linear limb very oblique wide-expanded, capsule nearly 1 in. sessile.—Didymocarpus sp. n. 29, *Herb. Ind. Or. H.f. & T.*

SIKKIM, alt. 5–8000 ft., common, (*Herb. Griffith*), *J. D. H.,* &c.

Stem 2–6 in., pilose; nodes 1–3. *Leaves* opposite, attaining 6 by 4 in., scarcely acute, base rounded or cordate; petiole $\frac{1}{2}$–3 in. *Peduncles* 2–3 in., often several; bracts caducous; bracteoles ovate, green, often concealing the calyx until the flower expands. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. *Corolla-tube* $\frac{1}{3}$ by $\frac{1}{20}$ in., limb $\frac{1}{2}$–$\frac{2}{3}$ in. diam., purple. *Ovary* glandular-hairy. *Capsule* straight.

14. **D. pulchra,** *Clarke*; stem and petioles ashy-puberulous, leaves oblong or elliptic minutely densely pubescent above whitened glabrate beneath, cyme viscous-hairy, calyx divided $\frac{1}{3}$ way down lobes triangular acute, corolla 1 in., capsule 1½ in. pedicelled. D. subalternans, *Clarke Comm. & Cyrt. Beng.* t. 55, *not of Wall.*

SIKKIM, alt. 6–7000 ft., common, (*Herb. Griffith*), *J. D. H.,* &c.

Stem attaining 1 foot; lower cauline leaves long-petioled, often 3–4-nate, uppermost sessile. *Leaves* 4½ by 2 in., acute, base often auricled on one side, crenate incised-serrate or nearly entire, coriaceous; nerves beneath raised, pubescent; petiole attaining 2–3 in. *Peduncles* 2–3 in.; bracts more or less foliaceous; bracteoles $\frac{1}{6}$ in., round, coloured; pedicels $\frac{1}{3}$ in. *Calyx* $\frac{1}{4}$ in., rose-purple, viscous-pilose. *Corolla* broadly tubular, sparsely hairy without, violet-purple. *Anthers* minutely hairy. *Ovary* glabrous. *Capsule-stalk* stout, longer than the calyx.—Nearly allied to *D. punduana.*

15. **D. punduana,** *Wall. Cat.* 777; stem and petioles ashy-pubescent, leaves oblong or elliptic crenulate or nearly entire densely puberulous above glabrate whitened beneath, calyx divided ⅓ the way down lobes ovate obtuse, capsule 1½ in. pedicelled. *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 53.—Didymocarpoid n. 971, *Griff. Itin. Notes*, 63.

KHASIA MTS., alt. 2–4000 ft., frequent; *Wallich, Griffith, H. f. & T.*, &c. ASSAM; *Griffith, Mrs. Mack.*

Stem 8–10 in., often with 3–4 petioled leaves in a whorl in its middle and 2 sessile leaves at its apex. *Leaves* coriaceous, base often unequally cordate, glabrous beneath or minutely pubescent on the nerves. Rays of the *cyme* and pedicels subumbellate, less viscous-hairy than in *D. pulchra. Calyx* ⅙ in., nearly glabrous. *Corolla* very sparsely hairy, purple. *Capsules* slightly curved; pedicels ⅓ in.—Otherwise as *D. pulchra.*

VAR. *attenuata*; leaves less coriaceous often cuneate at the base, cymes slenderer, bracts narrower, calyx scarcely ⅛ in., capsule slender pedicel filiform very long.—Khasia Mts., alt. 3–5000 ft., especially in the northern portion of the hills; *Griffith, H. f. & T.*, &c.—This may be specifically distinct, for both the capsule and calyx differ, but there are intermediate examples.

16. **D. Hookeri,** *Clarke Comm. & Cyrt. Beng.* t. 54; stem and petioles villous, leaves ovate crenulate softly villous above glabrate (except the nerves) beneath, calyx divided ⅓ the way down, corolla ½ in. pale, capsule 1⅓ in.—Didymocarpus sp. n. 21, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 5000 ft.; Kollong Rock, Moflong, Boga Pani, *H. f. & T.*, &c.

Stem 16 in., with usually 3–4 petioled verticillate leaves in the middle, uppermost leaves subsessile. *Leaves* 4 by 3 in. (sometimes much larger), subobtuse, often cordate; petiole ½–3 in. *Cymes* sparsely hairy; bracts ⅛ in., round; pedicels 0–⅓ in., usually short. *Calyx* ⅛ in., campanulate. *Corolla* tubular, pale yellow with rose-marks or nearly white. *Capsule* (appearing sessile) narrowing downwards gradually into a thick pedicel.

17. **D. acuminata,** *Br. in Benn. Pl. Jav. Rar.* p. 118; leaves ovate acute serrulate hairy above, calyx tubular glabrous scarcely lobed, corolla 1½ in. tube inflated upwards, capsule 1 in. pedicelled. *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 58. Calosacme acuminata, *Wall. Cat.* 802, *partly.* Chirita acuminata, *A. DC. Prodr.* ix. 269, *not of Br.*—Chirita sp. n. 9, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; alt. 4000 ft., near Churra, *Wallich, J. D. H. & T. T.*, &c.

Stem 6 in., hairy; nodes 1–3. *Leaves* opposite alternate and verticilled, often very unequal, larger 10 by 5½ in., subcordate, glabrous beneath except on the nerves; petiole attaining 4 in. *Peduncles* 1–4, ⅔–1½ in.; cymes 5–8-fld., nearly glabrous; bracts ⅙ in., glabrous; pedicels $\frac{1}{10}$–⅓ in., mostly short. *Calyx* ¼ in. and upwards. *Corolla* glabrous, white or very pale purple; lobes ¼–⅓ in., round. *Stamens*, 2 fertile, 2 rudimentary. *Ovary* glabrous; stigma peltate, oblique scarcely emarginate.—The corolla is that of *Chirita*, the capsule of *Didymocarpus*; the stigma is nearly as in *Chirita Kurzii*, from which it can hardly be generically separated.

18. **D. platycalyx,** *Clarke*; leaves oblong or elliptic crenate softly hairy, peduncles 1–5-fld., calyx widely campanulate subentire, corolla 1 in.

TENASSERIM; Moulmein, *Parish.*

Stem 6 in., hairy; nodes 1–3. *Leaves* opposite, 2–4 by 1¼ in., subacute, base cuneate or rounded, puberulous beneath; petiole ⅔–1 in. *Peduncles* ⅔ in., axillary, solitary, nearly glabrous; bracts ¼ in., broadly orbicular, green, puberulous; pedicels ⅓ in., puberulous. *Calyx* ¼ in., nearly hemispherical; margin undulated, purplish.

Corolla glabrous, tube cylindric violet, limb slightly oblique white; lobes ¼ in. diam., obtuse. *Stamens* 2 fertile; anthers oblong-peltate, cohering. *Ovary* minutely hairy, pedicelled elongate; style hardly any, stigma large circular. *Capsule* not seen.

Sect. 3. **Didymanthus.** Caulescent, sometimes but shortly. *Leaves* distant, upper (at least) opposite. *Peduncles* long; cyme-branches often elongate, subracemose with 2-nate pedicels. *Calyx* sub-5-partite. *Corolla* small or middle-sized; tube narrow or broad at the base. *Disc* 0 or shortly cylindric. *Capsule* 2-valved, rarely at first follicular.—Species of the Malay Peninsula and adjacent islands.

19. **D. mollis,** *Wall. Cat.* 790; leaves elliptic crenate narrowed at both ends hairy above, peduncles long, cyme lax viscous-pubescent, capsule nearly ⅔ in. sessile. *DC. Prodr.* ix. 266.

BURMA; Mts. near Prome, *Wallich.* CHITTAGONG; at Seetakoond, *J. D. H. & T. T.*

Stem 8 in., villous, near the base hirsute with fulvous deflexed hair. *Leaves* opposite, or the 4 uppermost subverticillate, 4 by 1½ in., acute, membranous, glabrate, beneath hairy on the nerves; nerves 9–11 pair; petiole ⅓ in., or of the uppermost leaves 0. *Peduncles* subterminal, often 4, 3 in., 12-fld.; pedicels ⅙ in. *Sepals* $\frac{1}{10}$ in., linear. *Disc* shortly cylindric. *Capsule* symmetrically 2-valved glabrous. *Corolla* not seen.

20. **D. paucinerva,** *Clarke*; leaves elliptic or obovate obtuse crenulate hairy above, peduncles subterminal long, cyme 2–8-fld. lax nearly glabrous, capsule rather more than ½ in. subsessile.

TENASSERIM; at Mergui, *Griffith* (Kew Distrib. n. 3853).

Stem 6 in., slender, simple, sparingly pilose except near the base. *Leaves* opposite (or the lower alternate), 2 by 1 in., closely shortly strigose above, glabrous whiter beneath; nerves 5–6 pair, puberulous; petiole ⅛–1 in. *Peduncles* 2 in., slender; pedicels $\frac{1}{10}$–⅓ in. *Disc* shortly cylindric. *Capsule* 2-valved, glabrous. *Corolla* not seen.—Appears closely allied to *D. mollis.*

21. **D. cordata,** *Wall. Cat.* 781; leaves cordate deeply crenate fulvous villous on both surfaces, peduncles long, cymes lax subracemose, pedicels distant often in pairs, corolla wide campanulate base gibbous. *DC. Prodr.* ix. 265.

PENANG; *Wallich, Maingay,* n. 1224.

Stem 20 in., fulvous-villous. *Leaves* (at least the upper) opposite, 6 by 4 in., shortly acuminate, base rounded; petiole 1½ in. *Peduncles* 8 in.; cymes often 6 in., glandular-hairy; bracts small, ovate, caducous; pedicels ½ in. *Sepals* $\frac{1}{16}$ in., lanceolate, nearly glabrous. *Corolla-tube* ¼ in. long and broad, glabrous; lobes ¼ in. diam., round. *Filaments* short; anthers large, 4 cohering. *Disc* 0. *Ovary* glabrous, sessile; style glabrous, stigma small. *Capsule* ⅔ in., slender, sessile, 2-valved, or sometimes (in Wallich's examples) subfollicular (at least at first).

22. **D. barbinerva,** *Clarke*; leaves narrowly obovate minutely crenate glabrous, midrib beneath hirsute, peduncles long, cyme dense glabrate, bracts round, sepals elliptic.

ATTRAN (near Moulmein).

Stem upwards, with the petioles, rufous-villous. *Leaves* (at least the upper) opposite, 6 by 1⅔ in., suddenly narrowed at the base; nerves 11 pair; petiole ⅛–1 in. *Peduncles* 5 in., nearly glabrous; cyme 1–1½ in. diam., many-fld.; bracts ¼–⅓ in. diam.; pedicels short, in fruit sometimes ⅔ in. *Sepals* ⅙ in., obtuse. *Corolla* ½ in., widely campanulate (badly preserved, seems nearly as of *D. cordata*). *Stamens* 2 fertile; anthers 2-celled; cells ovate, divaricate, scarcely confluent. *Ovary* glabrous,

sessile; disc 0; style as long as the ovary; stigma small subpeltate. *Capsule* 2 in., narrowly linear, follicular at first, afterwards 2-valved.

23. **D. rufipes,** *Clarke*; stem woody rufous-hirsute, leaves elliptic subacute silvery-hirsute on both surfaces, peduncles long rufous-villous laxly 7–12-fld.

TENASSERIM; at the base of Mooleyit, *Beddome*.

Stem 3 in., densely covered with long red hairs, leafy at the apex. *Leaves* 4 by 1½ in., closely crenate; petiole 0–⅓ in., rufous-hirsute. *Peduncles* arising below the leaves, 4–5 in.; cyme-branches obscurely or not at all racemose; bracts gone at fruit-time; pedicels ½–1½ in. *Calyx-segments* ¼ in., densely rufous-hirsute. *Corolla* not seen. *Capsule* 1–1½ in., narrowly linear, nearly erect, glabrous, follicular, ultimately 2–4-partite.

24. **D. longipes,** *Clarke*; leaves coriaceous narrowly obovate minutely crenate glabrous villous on the nerves beneath, peduncles very long, cyme laxly subracemose 3–7-fld., corolla more than ½ in. linear-tubular.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. n. 3854); *Cuming*, n. 2385; *Maingay*, n. 2723.

Stem 1–3 in., woody, hirsute, crowded with leaves at the summit. *Leaves* 6 by 1½ in., obtuse, long attenuate at the base sometimes sessile; nerves 6–8 pair, obscure. *Peduncles* attaining 1 foot, nearly glabrous; bracts very small, narrow; pedicels $\frac{1}{10}$ in., in remote pairs. *Sepals* $\frac{1}{10}$ in. *Ovary* and style subglabrous, stigma capitate. *Capsule* 1 in., sessile, ultimately 2-valved.

25. **D. corchorifolia,** *Wall. Cat.* 792; leaves lanceolate or ovate-lanceolate crenulate rusty-villous on both surfaces, peduncles very short 1–4-fld., corolla tubular straight, capsule 2 in. sessile. *DC. Prodr.* ix. 265.

PENANG; *Wallich, Maingay*.

Suffrutescent, branched, rufous-villous with deflexed hairs; innovations rufous-hirsute. *Leaves* 2½ by 1 in., acute, base rhomboid, rugose; petiole ¼ in. *Peduncles* on short axillary spurs, ¼–½ in., villous, upwards with the cymes glabrous; bracts ⅛–⅙ in., round, coloured; pedicels ⅛ in., often in pairs. *Sepals* ⅛ in., ovate or elliptic, obtuse or acute, glabrous, coloured. *Corolla* ⅓ in., glabrous, scarcely widened upwards. *Ovary* and style glandular-pubescent; disc shortly cylindric. *Capsule* subfollicular, sometimes ultimately 2-valved.

Sect. 4. **Heterobœa,** *Benth. in Gen. Pl.* ii. 1022. *Peduncles* 1–3-fld. short, or not elongate. *Calyx* 5-partite. *Corolla-tube* cylindric. *Disc* short-cylindric. *Capsule* follicular, ultimately sometimes 2-valved.—Species all Malayan.

* *Stem short; leaves crowded, elongate, many-nerved.*

26. **D. crinita,** *Jack in Mal. Misc.* i. ii. 1, and in *Trans. Linn. Soc.* xiv. 33, t. 2, fig. 2; leaves alternate crowded elongate oblanceolate closely serrate villous, corolla 1½ in. narrowly funnel-shaped, capsule 2 in. slender linear villous. *Wall. Cat.* 779; *DC. Prodr.* ix. 265; *Bot. Mag.* t. 4554. Henckelia crinita, *Spreng. Syst. curæ post.* 13.

PENANG; *Wallich, Helfer*. SINGAPORE; *Lobb*.—DISTRIB. Sumatra, Borneo.

Stem suffrutescent, short, thick, hirsute. *Leaves* 6 by 1 in., acuminate, base attenuate, subsessile, thick with shaggy hair; nerves 25 pair. *Peduncles* 1–1½ in., axillary or fascicled on shortened lateral spurs, or subconnate with the petiole; bracts minute linear. *Sepals* ⅛–⅙ in., oblong, villous. *Corolla* nearly straight, scarcely hairy without, pale purplish with yellow lines in the throat. *Capsule* follicular, ultimately 2-valved.

27. **D. platypus,** *Clarke*; leaves alternate crowded sessile oblanceolate sparsely villous base dilated incise-serrate, corolla 1½ in. narrowly funnel-shaped, capsule 2 in. slender linear.—Chirita sp. n. 29, *Herb. Ind. Or. H.f. & T.*

MALACCA; *Griffith, Cuming* (n. 2359), &c.; Mt. Ophir (*Herb. Wight*).—DISTRIB. Sumatra.

Leaves 9 by 2½ in., sprinkled above distantly with long hairs; nerves 30 pair, reticulated and villous beneath. *Inflorescence, flowers,* and *capsules* as of *D. crinita*, of which I suspect that this is a variety.

** *Stem creeping; leaves in opposite distant pairs.*

28. **D. reptans,** *Jack in Mal. Misc.* i. part ii. p. 3, and in *Trans. Linn. Soc.* 14, p. 35; creeping, leaves ovate or elliptic minutely crenate hirsute above with long hairs, peduncles 1-fld., corolla ½ in. nearly glabrous. *Wall. Cat.* 787; *DC. Prodr.* ix. 266. Henckelia reptans, *Spreng. Syst., curæ post.* p. 14.

PENANG; *Wallich, Maingay, Lobb.* MOULMEIN; *Lobb.*

Stem attaining a foot, branching, villous. *Leaves* opposite, 2 by 1 in., narrowed at both ends, scarcely acute; nerves 6 pair, villous beneath; petiole ⅓ in. *Peduncles* 1½ in., slender, thinly hairy; bracts small, linear. *Sepals* $\frac{1}{12}$ in., linear, pubescent. *Ovary* and style shortly pubescent. *Disc* short, cylindric. *Capsule* ⅝ in., follicular, sometimes ultimately 2-valved.

29. **D. marginata,** *Clarke*; creeping, leaves broad elliptic sprinkled with small hairs above ciliate-villous on the margin, peduncles 1-fld., corolla ½ in. villous.

MALACCA; *Lobb.*

Stem villous, rooting at the nodes. *Leaves* 2½ by 1¼ in., obtuse at both ends, subentire; petiole 1 in. *Sepals* ⅙ in., linear.—Very near *D. reptans*; the sepals are twice as long, the corolla hairy, the indumentum of the leaves different.

Sect. 5. **Loxocarpus.** Stemless, or one doubtful species creeping. *Leaves* crowded, nearly entire. *Peduncles* longish, few- or many-fld.; bracts small, narrow. *Calyx* divided nearly to the base. *Corolla-tube* short, limb 2-lipped, wide. *Disc* 0. *Ovary* sessile, pubescent; style as long as the ovary. *Capsule* lanceolate or linear, usually oblique at the base, follicular.—Malayan species. (LOXOCARPUS, *Br. in Benn. Pl. Jav. Rar.* pp. 115, 120.)

30. **D. incana,** *Benth. in Gen. Pl.* ii. 1022; leaves round often subcordate densely white-silky on both surfaces, cyme many-fld., capsule ¼–⅓ in. lanceolate base oblique. Loxonia? alata, *Wall. Cat.* 809. Loxocarpus alata, *Br. in Benn. Pl. Jav. Rar.* 120; *DC. Prodr.* ix. 277.

PENANG; *Wallich, Maingay.* SINGAPORE; *Lobb.*

Scapose. *Leaves* 1–3 in. diam., obtuse, entire or shallow-crenulate; petiole ⅓–2 in. *Peduncles* 3 in., white-villous; bracts ¼ in., linear; cyme very compound, white silky-villous. *Sepals* ⅛ in., linear. *Corolla* scarcely ¼ in., wide-campanulate, blue. *Ovary* villous; style glabrous. *Capsule* acute, white-villous.

31. **D. semitorta,** *Clarke*; leaves elliptic or ovate silky above reticulated beneath with broad densely villous nerves, peduncles 1–2-fld., sepals white-pilose, capsule ⅓ in. doubly curved half twisted round near the base.

MALACCA; Mt. Ophir, *Griffith, Lobb, Maingay.*

Scapose. *Leaves* 1½ by ⅘ in., obtuse at both ends, entire or obscurely crenate, densely softly silky above, glabrous between the nerves beneath; petiole up to 1½ in.

Peduncles 2½ in., thinly hairy; bracts $\frac{1}{12}$ in., oblong; pedicels $\frac{1}{8}$ in. *Sepals* $\frac{1}{6}$ in., oblong. *Corolla* $\frac{1}{3}$ in.; tube widely campanulate, limb very oblique. *Ovary* densely pilose; style nearly glabrous.

Sect. 6. **Orthobœa** (*Benth. in Gen. Pl.* ii. 1022). Stemless, or (*D. repens*) creeping. *Leaves* alternate or crowded. *Peduncles* long, many- or few-fld.; bracts small, narrow. *Sepals* linear or narrowly oblong. *Corolla-tube* cylindric or ventricose, not linear. *Ovary* sessile; style about as long as the ovary; disc 0. *Capsule* linear or sublanceolate, sessile, erect or scarcely oblique at the base; follicular, ultimately sometimes 2-valved.—Species of S. Deccan and Ceylon.

32. **D. Rottleriana,** *Wall. Cat.* 778; leaves oblong or elliptic, base attenuate deeply crenate white-villous on both surfaces, corolla $\frac{1}{3}$ in., capsule ½ in. densely villous when young. *Br. in. Benn. Pl. Jav. Rar.* 119.

NILGHIRI and KURG MTS.; *Heyne, &c.*

Leaves 3½ by 1½ in., obtuse, mature herbaceous softly strigose above pilose between the nerves beneath; petiole $\frac{3}{4}$ in., broad, entire. *Peduncles* 4 in., many-fld. *Sepals* $\frac{1}{10}$ in., narrowly oblong, villous. *Corolla* purple with yellow marks; tube short, mouth very oblique. *Ovary* very hairy; style glabrous. *Capsule* very acute.

VAR. *Wightii*; leaves less deeply crenate thick rugose tomentose, even when old sometimes densely white woolly, capsule less than $\frac{1}{3}$ in. D. Rottleriana, *Wight Ic.* t. 1348; *A. DC. Prodr.* ix. 268. Rottlera incana, *Vahl Enum.* i. 88. Henckelia incana, *Spreng. Syst.* i. 38.—Shevagherry Hills, near Courtallum; *Wight.*

33. **D. tomentosa,** *Wight Ic.* t. 1349, and *Ill.* t. 159 *bis*, fig. 1 (*stigma incorrect*); leaves elliptic attenuate at the base crenate tomentose, corolla ½ in., capsule $\frac{3}{4}$ in. sparsely villous.

HILLS in S. MADRAS; Courtallum, Jamalay, Bolamputty, *Wight.*

Leaves 3 by 2 in., obtuse, white-villous above, cinnamoneous or ferruginous villous or lanate beneath even when mature. *Corolla-tube* nearly $\frac{1}{3}$ in., curved. *Style* thick, glabrous; stigma large, glabrous.—In other respects resembling *D. Rottleriana* and a variety perhaps of it (Thwaites Enum. 207).

VAR. *lanuginosa*; petiole 0 or very broad, leaves spathulate-orbicular cinnamoneous tomentose beneath, peduncles long, cymes large.—Courtallum; *Wight.*

34. **D. lyrata,** *Wight Ic.* t. 1350; leaves lyrate, terminal lobe ovate incise-crenate or sublobulate thinly herbaceous villous on both surfaces, corolla scarcely $\frac{1}{3}$ in., capsule $\frac{1}{3}$–½ in. sparsely villous.

DECCAN PENINSULA; Courtallum, *Wight.*

Leaves attaining 8 in.; petiole nearly 6 in., incise-pinnatifid; limb 2–3 in. diam., base rounded. *Peduncles* 4–6 in., villous. *Flowers* and capsules nearly as in *D. Rottleriana.*—Closely allied to *D. Rottleriana,* rather than to *D. tomentosa,* which has larger flowers and capsules.

35. **D. Humboldtiana,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 477; leaves broadly elliptic, base usually rounded or cordate shallowly crenate thickly tomentose ultimately silky, sepals $\frac{1}{12}$ in. pilose, corolla ½ in. *Bot. Mag.* t. 4757.

CEYLON; up to 5000 ft. alt., common, *Gardner, &c.*

Leaves 3 by 1½–2½ in., obtuse, sometimes orbicular, base rarely shortly attenuate; petiole ½–2 in. *Peduncles* 2–4 in., pubescent, many-fld., or sometimes subracemose few-fld. *Corolla* pale purple, puberulous without. *Filaments* of the sterile stamens nearly as long as of the fertile. *Ovary* pilose; style glabrous. *Capsule* $\frac{3}{4}$ in., often oblique at the base.

VAR. *primulæfolia,* Thwaites Enum. 207 (not D. primulifolia, D. Don); leaves spathulate-elliptic, cymes subracemose slender, corolla scarcely $\frac{1}{3}$ in., sterile filaments

short, capsule slender. D. primulæfolia, *Gardn. in Calc. Journ. Nat. Hist.* vi. 478; *Bot. Mag.* t. 5161.—Ceylon; in the Hantam range near Kandy, *Gardner, Thwaites.* —Petiole $\frac{1}{3}$–2 in. *Sepals* $\frac{1}{12}$ in., narrowly oblong, white-pilose, not tomentose.

VAR. *recedens*; leaves large, base attenuate, cymes compound.—Ceylon; Wallekelly Hill, alt. 2000 ft., *Beckett.—Leaves* 6 by 4 in., thinly white-strigose above, rusty-pubescent on the nerves beneath, much thinner in texture than in the type; petiole scarcely $\frac{1}{8}$ in. *Peduncles* up to 8 in.

36. **D. floccosa,** *Thwaites Enum.* 207; leaves obovate crenulate tomentose above pale fulvous-floccose beneath, sepals $\frac{1}{8}$ in. narrowly oblong floccose, corolla-tube ventricose.

CEYLON; alt. 2000 ft., Central Province, near Dolosbage, *Thwaites.*

Leaves 6 by $3\frac{1}{2}$ in., obtuse, attenuate at the base; petiole 2 in. *Peduncles* 6 in., floccose; cyme 7-fld., densely floccose. *Corolla* $\frac{1}{2}$ in., pale purple; mouth contracted. *Capsule* 1 in., linear, follicular.—Nearly allied to *D. Humboldtiana.*

37. **D. zeylanica,** *Br. in Benn. Pl. Jav. Rar.* 119; leaves long-petioled cordate-ovate or round crenate or serrate densely strigose on both surfaces, cymes few-fld., corolla-tube nearly $\frac{1}{2}$ in. ovoid-cylindric lobes $\frac{1}{4}$ in. *DC. Prodr.* ix. 266; *Thwaites Enum.* 207. D. longepetiolata, *Gardn. in Calc. Journ. Nat. Hist.* vi. 475.

CEYLON, alt. 5–6000 ft.; near Adam's Peak, *Walker, Thwaites.*

Leaves 2–$3\frac{1}{2}$ in. diam., subobtuse; petiole $\frac{1}{2}$–5 in. *Peduncles* 2-$4\frac{1}{2}$ in., hairy, 3–9-fld. *Sepals* $\frac{1}{6}$–$\frac{1}{4}$ in., linear, pubescent with yellow hairs. *Corolla* white, tube dark-purple. *Stigma* oblique, orbicular. *Capsule* early glabrate.

38. **D. ovalifolia,** *Wight Ic.* t. 1351, and *Ill.* t. 142, fig. 6; leaves ovate crenate white-strigose on both surfaces, peduncles 3–5-fld., corolla broadly campanulate gibbous, base saccate, capsule 1 in.

S. DECCAN PENINSULA; Courtallum, *Wight;* S. Tinnevelly, alt. 5000 ft., *Beddome.*

Leaves 3 by $1\frac{3}{4}$ in., obtuse, base rounded, shallowly crenate, above densely beneath chiefly on the nerves strigose; nerves 8–12 pair, parallel; petiole 1–4 in. *Peduncles* $3\frac{1}{2}$ in. *Sepals* $\frac{1}{8}$ in. *Corolla* $\frac{1}{2}$–$\frac{3}{8}$ in., blue-yellow, nearly glabrous. *Filaments* short; anthers glabrous. *Ovary* pilose; style about as long as the ovary, nearly glabrous, stigma small subcapitate. *Capsule* linear, straight or somewhat oblique at the base.

39. **D. missionis,** *Wall. Cat.* 6396; leaves ovate or elliptic entire strigose on both surfaces, cymes subracemose many-fld., corolla funnel-shaped nearly symmetric. *DC. Prodr.* ix. 266. D. membranacea, *Bedd. Ic. Pl. Ind. Or.* t. 176.

DECCAN, *Herb. Madr.* S. TRAVANCORE; Pachemallay, alt. 2000 ft., *Beddome.*

Leaves $3\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., scarcely acute, base rounded, membranous; hairs brown in Wallich's dried example, white in Beddome's fresh ones; nerves 5–6 pair; petiole 1–$2\frac{1}{2}$ in. *Peduncles* 8 in., hairy; pedicels 0–$\frac{1}{4}$ in., often in distant pairs. *Sepals* $\frac{1}{6}$–$\frac{1}{4}$ in., lanceolate-subulate, hairy. *Corolla* $\frac{2}{3}$ in., glabrous, pale blue. *Anthers* minutely hairy. *Style* as long as the ovary, glabrous, stigma unilateral oblong. *Capsule* nearly 1 in., linear; subfollicular (Beddome), or 2-valved (DC.).

40. **D. repens,** *Bedd. Ic. Pl. Ind. Or.* t. 120; creeping, leaves long-petioled ovate-cordate serrate softly villous on both surfaces, peduncles 1–5-fld.

TRAVANCORE and TINNEVELLY, alt. 1–3000 ft.; *Beddome.*

Stem slender, hairy; nodes distant, rooting, bearing one leaf and one peduncle. *Leaves* 3 by 2 in., acute; petiole 4 in. *Peduncles* 3–5 in., villous; pedicels sub-

racemed in pairs, or (ex Beddome) nearly umbelled. *Sepals* 1/10 in. *Corolla* ½–⅔ in., tubular, curved, hairy without, blue. *Ovary* hairy; style as long as the ovary, glabrous, stigma oblique subpeltate. *Capsule* not seen.

V. **DIDISSANDRA,** *Clarke.*

Scapose perennials or suffrutescent. *Stamens* 4 fertile, didynamous. Otherwise as *Didymocarpus.*—Species 7, extending from India to Borneo.

Sect. 1. **Bœoides,** *Benth.* Scapose. *Nerves* of leaf very strong beneath, radiating.

1. **D. lanuginosa,** *Clarke*; stem hardly any, leaves elliptic or ovate, cymes and calyx glabrous or nearly so. Didymocarpus lanuginosa, *Wall. Cat.* 791, *not of Maximov.*; *DC. Prodr.* ix. 268; *Clarke Comm. & Cyrt. Beng.* t. 67.—Didymocarpoid, *Griff. Itin. Notes,* 64, n. 987.

TEMPERATE HIMALAYA, alt. 5–8000 ft., from Simla (*Edgeworth*) to Bhotan (*Griffith*) not common; Sikkim, Lachen, *J. D. H.* KHASIA MTS., alt. 5000 ft.; Kollong Rock, *Griffith, H. f. & T.,* &c.

Stem hardly any, with the base of the petioles and peduncles fulvous-shaggy. *Leaves* crowded, 3 by 1½ in., obtuse, base attenuated, crenate, above deciduously hirsute, beneath when young fulvous-woolly; petiole ½–1 in., or from the attenuation of the leaf-base 0. *Scapes* 2–6 in., glabrate upwards; cymes young woolly, ultimately glabrate, compound; pedicels ⅙–½ in. *Sepals* 1/12 in., lanceolate. *Corolla* ¾ in., long, hairy, pale blue or purple. *Anthers* peltate, cohering in pairs. *Ovary* glabrous; style minutely pilose. *Capsule* ¾ in., often curved.

2. **D. rufa,** *King in Hook. Ic. Pl.* t. 1437; stem and leaves of *D. lanuginosa,* but cymes densely woolly with brown hair.

EASTERN TIBET; Chumbi (E. of Sikkim), alt. 12,000 ft. (*Herb. King*).

Possibly only a state of *D. lanuginosa,* but the scape is stouter, pedicels shorter, inflorescence densely woolly, the flowers smaller, calyx shorter and its lobes more obtuse, the only capsule seen not ⅓ in. long.

Sect. 2. **Cyrtandroides.** Suffrutescent. *Peduncles* short, axillary, clustered, 1–3-fld. *Nerves* of leaf pinnate.

3. **D. frutescens,** *Jack in Mal. Misc.* i. ii. 1, and in *Trans. Linn. Soc.* xiv. 39; leaves oblanceolate fulvous-silky beneath, corolla 1¼ in., anthers small round. *Wall. Cat.* 780; *DC. Prodr.* ix. 265. Henckelia frutescens, *Spreng. Syst., curæ post.* 13.

PENANG; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 3856), *Maingay* (Kew Distrib. n. 1222).—DISTRIB. Sumatra.

Branches densely fulvous-villous upwards. *Leaves* opposite, 9 by 2½ in., acuminate, minutely crenate, mature glabrate above; petiole 2 in. *Peduncles* ⅛ in., silky; bracts ¼ in., narrow, silky; pedicels often 2, ¼ in., soon glabrous. *Sepals* ⅓ in., narrowly lanceolate, silky. *Corolla* 1¼ in. long, funnel-shaped, white, villous, soon nearly glabrous. *Anthers* small, round, cohering in pairs, when young of 2 divaricate ellipsoid cells, cells early confluent. *Ovary* glabrous; style minutely hairy. *Capsule* 3½ in.

VI. **CHIRITA,** *Ham.*

Herbs or low undershrubs. *Leaves* opposite, often unequal, sometimes whorled or alternate, elliptic or ovate, rarely lanceolate. *Cymes* axillary, many- or few-fld., or peduncles 1-fld.; bracts 2, shorter than the flowers, deciduous. *Calyx* 5-fid or sub-5-partite, not very small (except in *C. hamosa*);

lobes acute. *Corolla* tubular-funnel-shaped or ventricose, middle-sized or large (except in *C. hamosa*); tube not very narrow below nor gibbous; limb 2-lipped, lobes 5, rounded. *Stamens* 2 perfect, 2–3 barren, filaments flattened, geniculate; anthers usually applied to the stigma; cells 2, divaricate, ovate, often confluent. *Ovary* linear; style short or long, stigma (when young) oblique peltate, notched on the lower margin; in age upper margin usually produced oblong bifid; placentæ inflexed to the axis, then revolute bearing the ovules. *Capsule* elongate linear (smaller, slender in *C. hamosa*), sessile, loculicidally 2-valved to the base, valves 2-partite in the next season. *Seeds* ellipsoid, smooth, sometimes with a minute boss or process at the end; testa often striated, reticulate.—Species 25, mainly Indian; a few W. Malayan and Chinese.

The foregoing character does not include the Malayan and Chinese species. The genus, even thus narrowly defined, is with difficulty distinguished from *Didymocarpus*. The stigma is said to be subentire in *Didymocarpus*, bifid in *Chirita*, which is roughly true; in *Chirita* it varies greatly with age.

Sect. 1. **Euchirita.** *Calyx* large or middle-sized. *Corolla* 1¼ in. or more, funnel-shaped, tubular towards the base, mouth not very oblique nor unequally lipped. *Capsule* more than 2 in. long, not stalked.

* *Species of Ceylon.*

1. **C. Moonii,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 479; leaves whorled lanceolate or elliptic silky villous on both surfaces, peduncles scattered 1-fld., calyx sub-5-partite silky villous, corolla 2½ in. and upwards. *Bot. Mag.* t. 4405. Martynia lanceolata, *Moon Cat. Pl. Ceyl.* 45.

CEYLON; Hantam, alt. 4000 ft., *Thwaites*, *Wight*, &c.

Stem 2–3 ft., branched, villous upwards. *Leaves* 4 or 3 in a whorl, 5 by 2 in., minutely denticulate, densely softly hairy, and shining brown in the dried specimens; petiole ½ in. *Peduncles* ⅓–2 in.; bracts 2, small, deciduous near their middle. *Sepals* ⅔ in. and upwards, narrowly lanceolate. *Corolla* widely ventricose, mouth 2 in. across, minutely hairy without, purple, yellow-striped within. *Filaments* (fertile and sterile) villous at the top. *Ovary* glabrous; stigma obliquely 1-sided, shortly bifid. *Capsule* 4 in. and upwards.

2. **C. Walkeri,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 480; leaves ternate or opposite elliptic acuminate or lanceolate villous on both surfaces, peduncles 5–1-fld., calyx sub-5-partite villous, corolla 1½ in. C. Walkeriæ, *Hook. Bot. Mag.* t. 4327.

CEYLON; *Walker*.

Stem 2 ft., branched, villous upwards. *Leaves* 5 by 2 in., as of *C. Moonii*, but less densely hairy; petiole ⅓–1½ in. *Peduncles* ½–2 in., once or twice dichotomous, rarely 1-fld.; bracts small. *Calyx* ½–⅔ in. *Capsule* 2½–5 in.—Closely allied to *C. Moonii*, which differs in the 1-fld. peduncles and larger corolla.

VAR. *parviflora*; calyx ¼–⅓ in., corolla 1 in., capsule 2 in. Var. β, *Thwaites Enum.* 207.—Ceylon; *Thwaites*.

3. **C. zeylanica,** *Hook. Bot. Mag.* t. 4182; leaves opposite ovate or elliptic acuminate strigose on both surfaces, peduncles many-fld., calyx sub-5-partite glabrous, corolla 1 in. C. communis, *Gardn. in Calc. Journ. Nat. Hist.* vi. 481.

CEYLON; up to 5000 ft. alt. common; *Gardner*, &c.

Stem 18 in., branched, strigose upwards. *Leaves* 3 by 2 in. ovate, or 4½ by 2 in. elliptic, minutely denticulate, sparsely strigose; nerves 9 pair, hirsute beneath;

petiole ⅓–2 in. *Peduncles* 1–4 in., glabrous upwards; bracts ¼–½ in., ovate, glabrous. *Sepals* ⅓–½ in., elliptic-lanceolate. *Corolla* 1 in. diam., glabrous without, purple, yellow-striped within. *Filaments* hairy at the tip. *Ovary* glabrous; stigma unilateral. *Capsule* 4 in.

VAR. *angusta*; leaves narrowly lanceolate acute at both ends, nerves 6 pair, flowers somewhat smaller and paler. Var. β, *Thwaites Enum.* 208.—Ceylon; between Galle and Ratnapoora, *Thwaites.*

** *Species of the Himalaya and Khasia Mts.*

4. **C. bifolia,** *Don Prodr.* 90; stem 2-leaved, leaves sessile orbicular-quadrate thinly villous on both surfaces, peduncles 3–1-fld., calyx deeply 5-fid villous. *Royle Ill.* 204, t. 70, fig. 2; *DC. Prodr.* ix. 269; *Clarke Comm. & Cyrt. Beng.* t. 77. Calosacme amplectens, *Wall. Cat.* 306. Henckelia bifolia, *Dietr. Sp. Pl.* i. 574.

TEMPERATE W. HIMALAYA, alt. 6000 ft., from Gurwhal to Nepal; *Wallich*, &c.

Stem 3–6 in., simple, at flower-time leafless at the base, 2-leaved at the summit; one or two small bract-like leaves rarely added in the middle of the stem. *Leaves* equal or unequal, or one suppressed, 3 in. diam., base cordate or in the smaller attenuate, serrate. *Peduncles* 1–2, rarely more, rising between the two leaves, usually 2-fld., about 1 in.; bracts ¼ in., oblong, villous; pedicels ⅓ in. *Calyx* ½ in. and upwards, thin, subcorolloid; lobes ⅓ in., broad-lanceolate. *Corolla* nearly 2 in., almost straight, ventricose above the calyx, nearly glabrous without, purple-blue, below yellowish. *Filaments* hairy at the top. *Ovary* and style pubescent; stigma peltate oblique, notched on the lower side. *Capsule* not seen.

5. **C. pumila,** *Don Prodr.* 90; small or large, leaves elliptic acuminate mature pilose on both surfaces, bracts ciliate, calyx deeply 5-fid hirsute with white hairs herbaceous. *DC. Prodr.* ix. 269; *Clarke Comm. & Cyrt. Beng.* t. 74. C. flava, *Br. in Benn. Pl. Jav. Rar.* 117. C. Edgeworthii, *A. DC. Prodr.* ix. 269. C. diaphana, *Royle Ill.* 204, *name only.* C. polyneura var. α, *Clarke Comm. & Cyrt. Beng.* t. 75, *not of Miq.* Calosacme flava, *Wall. Cat.* 801. Bonnaya humilis, *Spreng. Syst., curæ post.* 15. Henckelia pumila, *Dietr. Sp. Pl.* i. 574.—Didymocarpus n. 18, *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 1500–6000 ft., from Simla to Mishmee; plentiful in Sikkim and Bhotan. KHASIA MTS., alt. 1–4000 ft., common.

Stem (in well-developed examples) 20 in., erect, branched; small examples with few or 2 leaves not rare. *Leaves* opposite, often unequal, 5½ by 2 in., closely serrate, mature hirsute above with white hairs, pubescent beneath; petiole ¾ in. *Peduncles* 2 in., 5–1-fld.; bracts ¼ in., ovate or oblong; pedicels ¼ in. *Calyx* ½ in. and upwards; lobes ⅓ in., narrowly lanceolate. *Corolla* 1¼ in., tubular-funnel-shaped, pubescent without, ¾ in. diam., purple-blue, yellowish below, sometimes pale-blue. *Stamens* glabrous. *Ovary* and style pubescent stigma unilateral, bifid. *Capsule* 4 in. and upwards.

6. **C. dimidiata,** *Br. in Benn. Pl. Jav. Rar.* 117; leaves elliptic acuminate mature strigose above glabrous beneath, bracts thinly ciliate, calyx 5-fid half-way down nearly glabrous whiteish. C. polyneura, var. β, *Clarke Comm. & Cyrt. Beng.* tt. 76, 72, *not of Miq.* Calosacme dimidiata, *Wall. Cat.* 803.

SIKKIM, BHOTAN, ASSAM, alt. 1500–4000 ft., frequent. KHASIA MTS., alt. 1500–3500 ft., common.

Closely resembling *C. pumila*. *Pedicels* shorter. *Calyx* ¾ in.; segments ⅓ in., narrowly lanceolate. *Corolla* 1½–2 in., rather larger than of *C. pumila,* white, mouth purple-blue, without the yellow tinge of *C. pumila.*

7. **C. calva,** *Clarke*; glabrous, leaves elliptic or oblong acuminate, calyx deeply 5-fid segments elliptic-oblong mucronate. C. glabra, *Clarke Comm. & Cyrt. Beng.* t. 73, *not of Miq.*—Chirita n. 20, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA, alt. 5–7000 ft.; Lachen, *J. D. H.*; Darjeeling, *Gamble.*

Stem 6–12 in. *Leaves* opposite, usually very unequal, sometimes alternate, attaining 6 by 2½ in. (often smaller and narrower), base very unequal, minutely denticulate, obscurely ciliate; petiole ⅛–2 in. *Peduncles* ¾ in., 3–1-fld. *Calyx* ½ in., lobed ⅔ the way down; segments herbaceous, obtuse with a mucro. *Corolla* 1½ in., nearly as of *C. pumila*, pale purple-blue, glabrous without. *Ovary* and style glabrous. *Capsule* not seen.

8. **C. macrophylla,** *Wall. Pl. As. Rar.* i. 56, t. 72; leaves ovate or elliptic acute hairy sparsely above more densely on the nerves beneath, peduncles several-fld., calyx and bracts nearly glabrous, corolla long yellow. *DC. Prodr.* ix. 269; *Clarke Comm. & Cyrt. Beng.* t. 71. Calosacme macrophylla, *Wall. Cat.* 805. Henckelia macrophylla, *Spreng. Syst., curæ post.* 14. H. grandifolia, *Dietr. Sp. Pl.* i. 576.

TEMPERATE E. HIMALAYA; from NEPAL to Bhotan, alt. 5–8000 ft., frequent.

Stem 4–18 in., pubescent. *Radical leaves* (usually present at flower-time much larger than the cauline) 6 by 3½ in., base cordate, crenate-serrate; petiole 4–9 in. *Peduncles* ½–5 in.; bracts ⅝ in., ovate, serrulate, subglabrous or pubescent only on the nerves beneath; pedicels ¼–2 in., nearly glabrous. *Calyx* ⅜–1 in., divided to the middle or nearly to the base; segments ovate-lanceolate or lanceolate. *Corolla* 2 in., tubular, scarcely swollen upwards. *Filaments* glabrous or minutely pilose. *Ovary* glabrous; style minutely pubescent, stigma unilateral deeply bifid. *Capsule* 4 in. and upwards.

9. **C. Kurzii,** *Clarke in Journ. Linn. Soc.* xv. 145; leaves elliptic or lanceolate acuminate, base cuneate strongly serrate hairy on both surfaces, peduncles few-fld., calyx hairy, corolla yellow. Didymocarpus Kurzii, *Clarke Comm. & Cyrt. Beng.* t. 66.

SIKKIM HIMALAYA; on the ridge between Sikkim and Nepal, alt. 9000 ft., *J. D. H.*, *Kurz, Dr. Treutler*, &c.

Stem 8–20 in., thick, villous, crowned by the larger leaves and approximated peduncles. *Leaves* opposite and alternate, attaining 8 by 4 in., acuminate; petiole ⅓–2 in. *Peduncles* 2–5 in., often 2–5; bracts ⅓ in., elliptic, villous; pedicels ¼–½ in., villous. *Sepals* nearly free, ½ in., broadly lanceolate, persistent. *Corolla* nearly 1½ in., narrowly funnel-shaped, pubescent, purple-spotted in the throat. *Ovary* and style pubescent; stigma subpeltate, oblique, notched on one side. *Capsule* 2 by ⅙ in., sessile, villous.

10. **C. urticæfolia,** *Ham. in Don Prodr.* 90; leaves elliptic acuminate sparsely hispidulous above villous on the nerves beneath, peduncles 5–1-fld., bracts nearly glabrous, calyx 5-fid half-way down hispid with white hairs, corolla largeish purple. *DC. Prodr.* ix. 268; *Clarke Comm. & Cyrt. Beng.* t. 69. C. grandiflora, *Wall. Pl. As. Rar.* i. 43, t. 50. Calosacme grandiflora, *Wall. Cat.* 800. Henckelia urticæfolia & Wallichiana, *Dietr. Sp. Pl.* i. 574. Gonatostemon Boucheanum, *Regel Gartenfl.* 1866, 353. t. 526.—Didymocarpi sp., *Griff. Notul.* iv. 155.—Cyrtandracea, *Griff. Ic. Pl. Ind. Or.* t. 436.

TEMPERATE HIMALAYA, alt. 4500–8000 ft., from Nepal to Bhotan, frequent.

Stem 8–18 in., hairy upwards. *Leaves* opposite, more or less unequal, 5 by 2 in., unequal at the base, serrate; petiole ⅜–2 in. *Peduncles* ⅜–2 in., sparingly pubescent; bracts ½ in., ovate; pedicels ¼–⅜ in., nearly glabrous. *Calyx* ¾ in.; lobes ½ in., triangular-lanceolate. *Corolla* nearly 2 in., narrowly funnel-shaped, sparsely hairy,

purple with yellow lines within. *Ovary* glabrous; style minutely pubescent, stigma unilateral deeply bifid. *Capsule* 4 in. and upwards.—The only species of *Chirita* in which the bracts are much *less* hairy than the calyx.

11. **C. Clarkei,** *Hook. f.*; almost stemless, leaves ovate or elliptic pubescent on both surfaces, calyx divided nearly to the base dusky villous, ovary dusky pubescent.—Chirita sp. n. 27, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Lachen, alt. 7–8000 ft., *J. D. H.*

Radical leaves 4½ by 3 in., shortly acute, base obtuse, crenate-serrate; petiole 1½–4 in. *Peduncles* 4 in., upwards (as the whole inflorescence) with many spreading glandular brown hairs; bracts ¼ in., oblong; pedicels 3–1, ⅓–1 in. *Calyx* scarcely ⅓ in., segments wide-lanceolate. *Corolla* (not expanded) of *Chirita*, glandular-villous without. *Stigma* subpeltate. *Capsule* elongate linear.—Seems near *C. urticæfolia*, differing in the smaller calyx and indumentum.

12. **C. Hookeri,** *Clarke Comm. & Cyrt. Beng.* t. 70; leaves elliptic acute hairy on both surfaces, peduncles 5–1-fld., bracts villous, calyx large densely hirsute.—Chirita sp. n. 22, *Herb. Ind. Or. H. f. & T.*

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3826). KHASIA MTS., *Griffith.*

Resembling generally *C. urticæfolia*. *Peduncles* villous; bracts 1 in., ovate-oblong, herbaceous; pedicels ⅓–⅔ in., villous. *Calyx* ⅔ in.; lobes ½ in., triangular-lanceolate. *Corolla* nearly as of *C. urticæfolia*; ex Griffith "pale blue the lower lip with 2 yellow lines.—Dr. King thinks this may be only a var. of *C. urticæfolia*, the numerous examples of which are however very constant in the comparative glabrousness of their bracts.

13. **C. acuminata,** *Br. in Benn. Pl. Jav. Rar.* 117; leaves elliptic or ovate acuminate hairy on both surfaces, peduncles many-fld., bracts oblong villous, calyx divided hardly half-way down rusty villous. *Clarke Comm. & Cyrt. Beng.* t. 81, *not of A. DC.* Incarvillea oblongifolia, *Roxb. Fl. Ind.* iii. 113. Calosacme acuminata, *Wall. Cat.* 802. Babactes oblongifolia, *DC. Prodr.* ix. 260. Æschynanthus acuminata, *G. Don Gen. Syst.* iv. 657.—Chirita sp. n. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., ASSAM, MISHMEE and CHITTAGONG HILLS, alt. 500-3500 ft., common.

Stem 2–6 ft., sometimes frutescent, closely villous upwards. *Leaves* opposite, subequal, 8 by 3½ in. (sometimes larger often much smaller), closely serrulate; petiole ½–3 in. *Peduncles* ⅓–2½ in., villous, laxly dichotomous; bracts and bracteoles ¼–½ in.; pedicels ⅜ in. *Calyx* ⅜ in.; lobes scarcely ⅙ in., ovate, acute. *Corolla* 1¼ in., tubular-ventricose, yellowish-white (or fide Roxburgh somewhat marked with red), nearly glabrous. Fertile *filaments* dilated, minutely pilose. *Ovary* and style hairy; stigma subpeltate, oblique, notched on one side, ultimately oblong bifid. *Capsule* 2–2½ by ⅙ in. *Seeds* broadly ellipsoid, umbonate at each end, obscurely ribbed and minutely reticulated.

14. **C. brevipes,** *Clarke*; nearly stemless, densely fulvous hairy, leaves ovate or elliptic acute, peduncles short 1–2-fld., calyx 5-fid half-way down lobes lanceolate. C. speciosa var. *a*, *Clarke Comm. & Cyrt. Beng.* t. 79, *not of Kurz.*—Chirita sp. n. 21, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 1500–4000 ft.; *Griffith* (Kew Distrib. n. 3828), &c.

Rhizome short, creeping with crowded nodes, very hairy. *Leaves* alternate, crowded, attaining 10 by 5 in., serrate; petiole up to 8 in. *Peduncles* ½–1 in.; bracts ½ in., oblong, densely villous; pedicels ½–1½ in. *Calyx* ⅔ in., lobes ½ in. *Corolla* nearly 2 in., minutely pubescent without (probably white). *Capsule* 4 in., woody, erect on the rigid thickened pedicel.—Kurz's *C. speciosa* from Yunan has very

long peduncles, short pedicels and linear calyx-segments: as regards size, *C. brevipes* is often as large as *C. speciosa.*

15. **C. primulacea,** *Clarke Comm. & Cyrt. Beng.* t. 82; almost stemless, softly villous, leaves long-petioled oblong incise-serrate, peduncles numerous short many-fld., calyx divided half-way down densely villous, corolla yellow-white.—Chirita sp. n. 16, *Herb. Ind. Or. H.f. & T.*

SIKKIM, alt. 2–3000 ft.; *J. D. H., Anderson,* &c.

Gregarious on steep wet rocks. *Leaves* pendent, 6 by 2½ in.; petiole 2–6 in. *Flowers* forming rosulate clusters; whole inflorescence softly villous. *Peduncles* $\frac{1}{8}$–$\frac{1}{2}$ in., 1–2–3-tomous; bracts $\frac{1}{6}$–$\frac{1}{3}$ in., oblong; pedicels $\frac{1}{3}$ in. *Calyx* $\frac{1}{3}$ in., lobes lanceolate acute. *Corolla* 1 in. and upwards, narrowly funnel-shaped, minutely pubescent without. *Ovary* and style densely shortly villous, stigma obliquely peltate, lower margin notched. *Capsule* 2 in.

16. **C. monophylla,** *Clarke*; leaf solitary sessile cordate-ovate, peduncle hardly any 1–2-fld., calyx divided half-way down brown-hirsute.—Chirita sp. 30, *Herb. Ind. Or. H.f. & T.*

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3832).

Stem 4–10 in., simple, erect, with sometimes 1 or 2 small scale-like leaves in its middle. *Leaf* (at flower-time) 1 in., ovate, acute, at fruit-time 7 in. diam., cordate or shortly peltate, glabrous above, villous on the nerves beneath. *Peduncle* (in the axil of the leaf) scarcely [illegible] in.; bracts small; pedicels $\frac{1}{10}$–$\frac{1}{3}$ in. *Calyx* $\frac{1}{2}$ in. and upwards, white or purple-spotted; lobes $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate-subulate. *Corolla* 2 in., narrowly funnel-shaped, glabrous without. *Ovary* and style glabrous. *Capsule* 2½ in. *Seeds* of the genus.—From the extraordinary manner in which the solitary leaf continues growing to the period of ripening the capsule, it may be suspected that it is a persistent cotyledon.

17. **C. caliginosa,** *Clarke*; stem long leafy, leaves falcate-elliptic acuminate at both ends pubescent, cymes axillary few-fld. lax, sepals lanceolate much acuminate.

Peninsula of MALACCA; Klang in Selangore, *Beccari.*

Stem 1 foot, pubescent. *Leaves* opposite, 6 by 2½ in., minutely toothed; petiole 1½ in. *Peduncles* 0–$\frac{1}{4}$ in.; bracts and bracteoles 0, or very early caducous; pedicels $\frac{1}{4}$–2 in., patently pubescent. *Sepals* $\frac{3}{4}$–1 in., dusky-pubescent. *Corolla* 1½ in.; tube upwards villous with brown hairs, limb within (in the dry specimen) lurid-blue. *Anthers* very large, subquadrate, with long hair. *Ovary* fuscous-pubescent; stigma unilateral, shortly bifid. *Capsule* 3 in., curved, dusky-hairy.—The whole plant is dusky; the habit and inflorescence ally it to the next section, *Microchirita*; but the calyx is large.

Sect. 2. **Microchirita.** *Calyx* about $\frac{1}{4}$ in., divided nearly to the base into narrow segments. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in., tube narrow below much curved above, mouth very oblique, lower lip larger. *Capsule* slender.

18. **C. hamosa,** *Br. in Benn. Pl. Jav. Rar.* 117; leaves ovate or elliptic acute, peduncles connate and adnate to the petiole ebracteolate, capsule slender often much curved. *Clarke Comm. & Cyrt. Beng.* t. 78. Didymocarpus hamosa, *Wall. Cat.* 788. D. cristata, *Dalz. in Hook. Kew Journ.* iii. 225; *Dalz. & Gibs. Bomb. Fl.* 134.—Chirita sp. n. 20, *Herb. Ind. Or. H.f. & T.*

KHASIA MTS., alt. 1–4000 ft., *Wallich, Griffith, H. f. & T.,* &c. MARTABAN; *Wallich.* MOULMEIN; *Lobb, Parish.* W. DECCAN PENINSULA; *Stocks, Law, Dalzell.*

Stem $\frac{1}{2}$–20 in., sparingly pilose. *Leaves* opposite, subequal, 6–1 by 4–$\frac{1}{2}$ in., base rounded, obscurely crenate, thin, weakly hairy on both surfaces; petiole $\frac{1}{8}$–$\frac{3}{8}$ in.

Peduncles (their free portion) 0–⅔ in., hispidulous. *Sepals* ¼ in., sublinear, patently hairy. *Corolla* scarcely ⅔ in.; tube slender, nearly white, mouth pale blue or somewhat rose. *Stigma* distinctly bifid. *Capsule* 1–3 in.

VAR. *unifolia*; stem ¼–1 in., with one leaf at the top and 5–1 flowers. Chirita sp. n. 31, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 500 ft., on the river bank near Terrya Ghaut, *J. D. H.* Moulmein; Thoungyne, *Lobb.*—Extremely unlike the ordinary form of *C. hamosa*, but except in its minute size no distinction can be found. The single leaf is perhaps a persistent cotyledon, carried up as in some other species of the Order; and the plant may be specifically distinct.

VII. **PLATYSTEMMA,** *Wall.*

A small, slender herb. *Leaf* 1 (a persistent cotyledon?) sessile, orbicular-cordate, membranous, hairy. *Peduncle* from the leaf-axil, slender, few-fld.; bracts very small, sublinear. *Calyx* wide-campanulate, deeply 5-fid. *Corolla* violet, subrotate, deeply 2-lipped; lips wide-spreading, upper shortly bifid, lower deeply 3-lobed; lobes all wide-oblong, obtuse. *Stamens* 4 perfect, filaments short, curved; anthers cohering by their tips, 2-celled; cells round, divaricate, early confluent, dehiscing by a single short slit. *Ovary* ovoid; disc annular; style linear, much longer than the ovary, stigma small; placentæ deeply intruded, then bifid, branches recurved, bearing ovules on their margins on both faces. *Capsule* narrowly oblong, nearly as in *Didymocarpus*.

P. violoides, *Wall. Cat.* 4410, and *Pl. As. Rar.* ii. 42, t. 151; *Royle Ill.* 294, t. 71, fig. 1; *DC. Prodr.* ix. 279; *Wight Ill.* t. 159 *bis*, fig. 10. P. majus, *Wall. Cat.* 4411, and *Pl. As. Rar.* ii. 42, *in obs.*

TEMPERATE W. HIMALAYA, alt. 6–9000 ft.; from Nepal, *Wallich*, to Simla, *Strachey & Winterbottom.*

Stem 2½–5 in., pubescent. *Leaf* 1½–2½ in., subacute, coarsely serrate, hairy above, glabrous beneath, pubescent on the nerves. *Peduncle* ⅓–1½ in., 1–11-fld.; bracts ⅛ in., deciduous; cyme usually trichotomous, lateral branches 3-fld.; pedicels 0–⅓ in. *Sepals* $\frac{1}{12}$ in., subovate, puberulous. *Corolla* ⅓ in., lips of equal length. *Capsule* only known from Royle's figure.

VIII. **CHAMPIONIA,** *Gardn.*

A low, perennial, erect, hairy herb. *Leaves* opposite, subequal, petioled. *Peduncles* slender; bracts small; cymes lax; flowers white. *Sepals* 5, small, narrow. *Corolla-tube* short; limb spreading, subequally 4-lobed. *Stamens* 4 perfect, filaments short, thick; anther-cells ellipsoid, nearly parallel, slits confluent at their apex. *Ovary* sessile, oblong; disc 0; style linear, stigma subcapitate; placentæ of two plane plates bearing ovules on both faces. *Capsule* oblong, acute, loculicidally 2-valved, valves soon 2-partite; placentæ in fruit hardly altered. *Seeds* minute, ellipsoid, subacute at each end, smooth, minutely striate and reticulated.

C. reticulata, *Gardn. in Calc. Journ. Nat. Hist.* vi. 485; leaves oblong subentire, nerves slender close together.

CEYLON, alt. 3000 ft., frequent.

Stem 2–6 in., undivided, duskily villous upwards. *Leaves* 4 by 1¼ in., obtuse or shortly acute, base cuneate, thinly strigose above, dusky-villous on the nerves beneath; petiole ½ in. *Peduncles* 2–3 in., 3–10-fld., hairy; bracts ½ in., linear; pedicels ¼–⅓ in., slender. *Sepals* $\frac{1}{10}$ in., linear, hairy. *Corolla-tube* $\frac{1}{12}$ in.; lobes ¼ in., widely oblong, glabrous. *Ovary* and style glabrous. *Capsule* ½ by $\frac{1}{12}$ in.; placentæ narrower than the valves, not recurved.

IX. **BŒICA,** *Clarke.*

Undershrubs. *Leaves* alternate, petioled. *Cymes* much branched, axillary, lax-fld.; bracts small. *Calyx* small, 5-fid or -partite. *Corolla* small, deeply 5-fid, glabrous, widely gibbous at the base, obscurely 2-lipped; lobes subequal, obtuse, purple or white. *Stamens* 4, attached near the base of the corolla-tube, subequal, glabrous, filaments short; anthers 2-celled, not cohering in pairs; cells ellipsoid, subparallel, slits curved coalescent at the top. *Ovary* sessile, narrowly oblong; style as long as the ovary, glabrous, stigma punctiform; disc 0; placentæ deeply inflexed, nearly meeting, then recurved bearing ovules. *Capsule* shortly linear, straight, beaked by the erect style, loculicidal, and soon septicidal; placentæ recurved, enrolling the seeds. *Seeds* very small, ellipsoid, smooth.—Species 5, in Assam, Bhotan and N. Burma.

1. **B. filiformis,** *Clarke Comm. & Cyrt. Beng.* t. 87; innovations nearly glabrous, leaves lanceolate acuminate at both ends mature glabrous, peduncles solitary long, cyme with capillary branches and pedicels nearly glabrous.—Rhynchotechum sp.?, *Wall. Cat.* 9079, *in part.* Chelone filiformis, *Ham. ms.*

ASSAM; near Goalpara, *Hamilton*, &c. BHOTAN; in Upper Singfo everywhere, *Griffith.* KHASIA MTS.; *Griffith.* CACHAR; *Keenan.*

Branches long, leafy, glabrous to the tip. *Leaves* 7 by 2 in., minutely dentate; petiole $\frac{1}{3}$–1 in. *Peduncles* 2–4 in.; bracts $\frac{1}{16}$ in., linear. *Calyx* $\frac{1}{12}$ in. *Corolla* $\frac{1}{6}$ in., purple. *Capsule* $\frac{1}{3}$ in.

2. **B. Griffithii,** *Clarke Comm. & Cyrt. Beng.* t. 86; innovations fulvous-silky, leaves lanceolate acuminate at both ends mature fulvous-villous beneath, peduncles short usually 2–3 fascicled, cyme much branched intricate.—Rhynchotechum sp.?, *Wall. Cat.* 9079, *in part.* Chelone rubicunda, *Ham. ms.*

ASSAM; Goalpara, *Hamilton.*

Leaves 8 by $2\frac{1}{4}$ in., denticulate, mature glabrous above. *Peduncles* 1–2 in., clustered, or peduncle may be considered hardly any branched from the base; cyme branches divaricate and recurved.—Otherwise nearly as *B. filiformis.*

3. **B. fulva,** *Clarke Comm. & Cyrt. Beng.* t. 85; innovations fulvous-woolly, leaves lanceolate acuminate at both ends fulvous-villous beneath, peduncles solitary elongate, bracts fulvous-tomentose.—Cyrtandracea n. 328, *Griff. Itin. Notes*, p. 120.

ASSAM; *Masters.* BHOTAN and MISHMEE, alt. 4200 ft., near Chulleree, *Griffith* (Kew Distrib. n. 3844).

Leaves 7 by 2 in., obscurely denticulate, mature glabrous above or fulvous-pubescent along the nerves. *Peduncles* 4–6 in., fulvous floccose; bracts $\frac{1}{6}$–$\frac{1}{2}$ in., persistent; pedicels floccose. *Flowers* and capsules nearly as of *B. filiformis.*

4. **B. hirsuta,** *Clarke*; very shaggy, leaves wide-lanceolate acuminate at both ends densely fulvous-shaggy above, peduncles solitary long, cymes fulvous-hirsute.

UPPER ASSAM?; on the Soondra bank.

Branches thick, shaggy with yellow hair $\frac{1}{4}$–$\frac{1}{3}$ in. long, dense with leaves. *Leaves* 7 by $2\frac{1}{2}$ in., obscurely denticulate, shaggy above with hairs $\frac{1}{4}$ in. long from tubercular bases, villous beneath; petiole $\frac{1}{3}$ in. *Peduncles* 2–4 in.; bracts $\frac{1}{3}$ in., elliptic or oblong; cymes as though compound umbels. *Sepals* $\frac{1}{8}$ in., linear, shaggy. *Corolla* not seen. *Capsule* $\frac{1}{4}$ in., minutely hairy, 4-valved.

X. **TETRAPHYLLUM,** *Griff.*

A tawny-villous undershrub; stem elongate, leafless or sparsely scaly below, with 4 leaves whorled at the apex. *Leaves* nearly sessile, ovate, unequal-sided. *Cymes* dense, subcapitate, nearly sessile; bracts elliptic. *Calyx* somewhat large, obscurely 2-lipped, sub-5-partite. *Corolla* widely funnel-shaped, silky, blue; lobes 5, subequal, ovate. *Stamens* 2 perfect, filaments short; anthers 2-celled, apex submucronate; cells ellipsoid, nearly parallel, slits longitudinal. *Ovary* ellipsoid, acute; style linear, stigma small, obscurely 2-lobed; placentæ deeply intruded, 2-partite, revolute, bearing ovules on both sides. *Capsule* narrowly lanceolate, ultimately 4-valved to the base, leaving two ribs united to the style and 4 papery enrolled placentæ. *Seeds* ellipsoid, obtuse at both ends; testa laxly reticulate, appearing rough or scaly.

T. bengalense, *Clarke.*—Tetraphyllum, *Griff. Notul.* iv. 148 (without descr.). Phyllobœa sp., *Benth. in Gen. Pl.* ii. 1020.—*Clarke Comm. & Cyrt. Beng.* t. 87 *bis.*

UPPER ASSAM; *Griffith.* MISHMEE; Namroop, *Griffith* (Kew Distrib. n. 3830). CACHAR (*Keenan*). CHITTAGONG HILLS; *Clarke.*

Stem 4–12 in., duskily woolly, below without leaves or with 1 or 2 pairs of scales 1 in. long; innovations fulvous silky-woolly. *Leaves* 2 pairs at the summit of the stem, 6 by 4 in., acute, base unequal, mature glabrate above, beneath duskily villous at least on the nerves. *Cymes* 10–30-fld. *Sepals* $\frac{1}{2}$ in., lanceolate, fulvous-silky. *Corolla* $\frac{2}{3}$ in.; lobes $\frac{1}{3}$ in. *Stamens* glabrous. *Ovary* (upwards with the style) silky. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{10}$ in., acute.

XI. **TRISEPALUM,** *Clarke.*

Undershrubs; stems short, villous or tomentose. *Leaves* opposite, alternate or crowded, narrowly lanceolate, obscurely toothed. *Peduncles* axillary, elongate, laxly 1–5-fld.; bracts long. *Calyx* 2-lipped; sepals 3, 2 narrow, the third broader shortly 3-lobed. *Corolla* broadly obliquely campanulate, obscurely 2-lipped; lobes 5, ovate, obtuse. *Stamens* 2 perfect, filaments short; anthers large, cordate-ovate, adhering by their faces, 2-celled; slits short, soon confluent. *Ovary* oblong; stigma simple, one-sided; placentæ deeply intruded, bifid, shortly recurved. *Capsule* oblong, shorter than the calyx, loculicidally 2-valved, soon 4-valved, valves not twisted; placentæ shortly recurved, not membranous. *Seeds* minute.—Species 2, in Lower Burma.

1. **T. obtusum,** *Clarke*; villous, stem very short, leaves opposite and alternate linear-lanceolate, cymes 1–5-fld., calyx-segments oblong obtuse.—Phyllobœa sp. *Benth. in Gen. Pl.* ii. 1020.

TENASSERIM; Moulmein, *Lobb.*

Stem 2–4 in., densely leafy, upwards (with the innovations) rufous-woolly. *Leaves* 5 by $\frac{1}{2}$ in., base much attenuated, crenulate, above white-villous, beneath rufous-woolly on the nerves; petiole $\frac{1}{2}$ in. or hardly any. *Peduncles* 1–3 in., flocculose with rufous deciduous wool; bracts $\frac{1}{3}$ in., ovate, somewhat thick, villous or woolly; pedicels hardly longer than the bracts. *Calyx* $\frac{1}{4}$ in.; one lip 2-partite, the other 3-fid; segments rounded, green at the apex, recurved. *Corolla* $\frac{1}{3}$ in., widely funnel-shaped, glabrous; lobes rounded. *Stamens* of the genus. *Style* linear, scabrous from numerous subsessile glands, stigma very shortly 2-lobed. *Capsule-valves* $\frac{1}{6}$ in., oblong, acute, rigid, bearing the placentæ in the middle.

2. **T. acutum,** *Clarke*; stem very short, leaves alternate narrowly lanceolate hairy, cymes laxly 1–3-fld., calyx-segments elongate-lanceolate.

TENASSERIM; at Moulmein, *Parish.*

Stem scarcely 2 in., densely leafy, upwards (with the innovations) rusty woolly. *Leaves* 5 by 1 in., acuminate at both ends, minutely crenate-sinuate, mature puberulous on both surfaces; petiole 2 in. *Peduncles* 2–4 in., puberulous; bracts $\frac{2}{3}$ in., narrowly lanceolate; pedicels $\frac{1}{3}$–1 in. *Calyx* $\frac{1}{2}$ in., pubescent, one lip 2-partite the other 3-lobed half-way down. *Corolla* $\frac{2}{3}$ in., wide funnel-shaped, glabrous, purple-rose; lobes rounded, 2 upper more blue. *Stamens* of the genus. *Style* linear, pubescent, stigma produced on one side. *Capsule* (immature) oblong, hairy.

XII. **PHYLLOBÆA,** *Benth. partly.*

An erect herb. *Leaves* opposite. *Cymes* peduncled, bracts conspicuous; flowers rose. *Calyx* large, 2-lipped; one lip 2-partite nearly to the base, the other 3-lobed half-way down. *Corolla* wide-campanulate, sub-bilabiate; lobes 5, ovate, nearly equal. *Stamens* 2 perfect, filaments very short; anthers large, round, connivent, 2-celled; cells ovate, divaricate, soon appearing 1-celled, dehiscing by a single short slit; staminodes 2–3 or 0. *Ovary* oblong, acute; disc unilateral; style longer than the ovary, stigma produced on one side; placentæ deeply intruded, bifid, branches much recurved bearing ovules on both surfaces. *Capsule* narrow-lanceolate, longer than the calyx, follicular, afterwards 2-valved; valves twisted; placentæ papery, revolute. *Seeds* ellipsoid, rugose-reticulate.

P. amplexicaulis, *Benth. in Gen. Pl.* ii. 1020; glabrous, stem long, leaves round, petioles winged amplexicaul, cyme-branches densely many-fld., bracts broad almost imbricate. Bœa amplexicaulis, *Parish ms.*; *Clarke Comm. & Cyrt. Beng.* t. 84.

TENASSERIM; at Moulmein, *Parish.* PEGU; Kambila-toung, alt. 3200 ft., *Kurz.*

Branches 6–12 in. *Leaves* 6–10 in. diam., shortly acuminate, crenate-sinuate; petiole 4 by $\frac{1}{3}$ in. *Peduncles* 4–6 in., stout, axillary, solitary, often opposite; bracts $\frac{1}{2}$ in., round, connate at the base; cymes dichotomous; branches 2 in., 5–25-fld.; pedicels 0–$\frac{1}{6}$ in.; bracteoles similar to the bracts but smaller. *Calyx* $\frac{1}{2}$ in.; lobes herbaceous, spathulate-oblong, obtuse. *Corolla* $\frac{1}{3}$ in. long, $\frac{2}{3}$ in. diam., white suffused with rose. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., conical upwards, valves twisted into 2 or 3 complete spires.

XIII. **BŒA,** *Commers.*

Perennial herbs; caulescent or scapose. *Leaves* opposite or crowded. *Peduncles* axillary, usually long; cymes lax or few-fld.; bracts small. *Sepals* 5, small, narrow. *Corolla* small or middle-sized, widely campanulate, somewhat unequal at the base, glabrous, 2-lipped; lobes 5, ovate, obtuse. *Stamens* 2 perfect, 2–3 rudimentary; filaments short, linear (in the Indian species); anthers 2-celled, often cohering at the apex; cells ovate, divergent at the base, slits usually confluent at the apex. *Ovary* sessile, linear; disc 0; style as long as the ovary, glabrous upwards, stigma small obscurely 2-lobed; placentæ inflexed nearly to the axis, then recurved bearing the ovules. *Capsule* linear, loculicidal; valves 2, twisted; placentæ at first attached to the valves, twisted with them, afterwards separating from the valves, which often again split each into two. *Seeds* minute, ellipsoid, smooth, testa minutely reticulate.—Species 12, Indian, N. Chinese, N. Australian and the New Hebridean.

The generic name was by Commerson spelt originally *Beaua* in ms., and afterwards simplified to Bea, also in ms. It was first published in Lamk. Dict. (1783) i. 401, and spelt Bœa; afterwards in Juss. Gen. (1789) 121 as Bæa. Bæa was adopted by Brown, DC., and by Bentham in Gen. Plant., but Bœa has priority of publication.

1. **B. prolixa,** *Clarke*; stem short, leaves lanceolate or ovate-lanceolate coriaceous tomentose beneath, peduncle very long, cymes many-fld., capsule $\frac{1}{2}$ in.

PEGU; at Thoungyun, *Kurz.*

Stem $2\frac{1}{2}$ in., closely tomentose. *Leaves* opposite, crowded, 4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., acute, rhomboid at the base, minutely crenulate, arachnoid above; nerves beneath obscured by tomentum; petiole 1 in. *Peduncle* 9 in., rusty-tomentose; cyme $2\frac{1}{2}$ in. diam., about 50-fld., with deciduous tomentum; pedicels $\frac{1}{4}$ in., puberulous. *Sepals* $\frac{1}{12}$ in., linear, nearly glabrous. *Corolla* not seen. *Capsule* glabrous.

2. **B. multiflora,** *Br. in Benn. Pl. Jav. Rar.* 120; stem short, leaves narrowly elliptic regularly crenate mature glabrate above villous or lanate on the reticulated nerves beneath, cymes many-fld., capsule $\frac{1}{2}$ in. *A. DC. Prodr.* ix. 272. B. flocculosa, *Clarke Comm. & Cyrt. Beng.* t. 83. Didymocarpus multiflora, *Wall. Cat.* 793.—Bœa sp. nn. 2 and 4, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 1–3000 ft.; *Wallich, H. f. & T.*, &c. ASSAM; *Griffith.* MOULMEIN; *Parish.*—DISTRIB. Cochin China.

Stem 1–5 in.; upwards cinnamoneous-tomentose. *Leaves* crowded, 6 by $2\frac{1}{4}$ in., subobtuse, base unequally rhomboid, deciduously floccose above, ultimately nearly glabrous beneath except on the much-elevated nerves; petiole $\frac{1}{8}$–1 in. *Peduncles* several, 4–7 in., floccose-tomentose; cyme 2–3 in. diam., up to 50-fld., tomentose. *Sepals* $\frac{1}{12}$ in., sublinear. *Corolla* $\frac{1}{4}$ in., puberulous without. *Ovary* densely covered with sessile glands; style glabrous. *Capsule* glandular-puberulous.—In the Khasian plant the nerves of the leaves beneath are thick, tomentose; in the Burmese plant they are beneath slenderer, pubescent; and the branches of the cyme are slenderer.

3. **B. herbacea,** *Clarke*; leaves nearly sessile distant opposite elliptic acuminate crenate-serrate sparsely pilose on both surfaces, base attenuate, cymes contracted many-fld., capsule $\frac{1}{4}$ in.—Bœa n. 3, *Herb. Ind. Or. H. f. & T.*

TENASSERIM; at Moulmein, *Parish.*

Stem 4–8 in., slender, softly hairy. *Leaves* 8 by 3 in., or hardly half these dimensions, often amplexicaul. *Peduncles* 1–4, $2\frac{1}{4}$ in., softly hairy; cymes $1\frac{1}{2}$ in. diam., green, viscidly hairy. *Sepals* $\frac{1}{16}$ in., narrowly oblong, viscidly hairy. *Corolla* $\frac{1}{4}$ in., glabrous. *Ovary* glistening with yellow glands; style glabrous upwards. *Capsule* glandular-viscous, closely reflexed in young fruit.—Excessively variable in the size of the leaves.

XIV. ORNITHOBŒA, *Clarke.*

A caulescent herb. *Leaves* opposite, distant, petioled. *Peduncles* axillary, solitary, short; cymes panicled. *Sepals* 5, not small. *Corolla* tubular, 2-lipped; upper lip of 2 reflexed lobes; lower 3-lobed, two lateral lobes narrow lanceolate patent, middle lobe smaller recurved, with a dense tuft of blue hairs at its base. *Stamens* 2 perfect, 3 rudimentary, filaments short; anthers 2-celled, united at the apex by a short ligule; cells subparallel, broad, scarcely confluent at the apex. *Ovary* sessile, ellipsoid; disc 0; style as long as the ovary, stigma minute sub-2-lobed; placentæ deeply inflexed, nearly meeting, then recurved bearing the ovules. *Capsule* narrowly lanceolate, 2-valved, valves twisted before dehiscence; placentæ

recurved enclosing the seeds. *Seeds* minute, ellipsoid, smooth; testa striate, reticulate.

O. Parishii, *Clarke.*

TENASSERIM; at Moulmein, *Parish.*

Stem 7 in., slender, pubescent. *Leaves* 6 by 2½ in., elliptic, acute, base unequal, crenate-serrate, thinly softly hairy on both surfaces; petiole 2–4 in. *Cymes* hardly longer than the petiole, solitary from nearly every axil; bracts ⅛ in., linear; pedicels ⅓–½ in., subracemose. *Sepals* ⅛ in., oblong, green, pubescent, persistent, subreflexed in fruit. *Corolla* nearly ⅓ in., personate, pale blue, glabrous except the palate. *Capsule* ½ by $\frac{1}{12}$ in., hairy, green, scarcely acute.—A complete drawing with full analysis of this plant was sent to Sir W. Hooker by Mr. Parish; it resembles a Bœa but for the corolla and the broader submembranous capsule, which resembles *Phyllobœa.*

XV. **KLUGIA,** *Schlecht.*

Herbs, rooting at the base, then erect, somewhat succulent. *Leaves* alternate (or subopposite one of the pair reduced to an auricle), acuminate, unequal-sided, cordately auricled on one side of the unequal base, subentire or sinuate, many-nerved. *Racemes* terminal or leaf opposed, many-fld.; bracts 0; bracteoles at the base of the pedicels small, linear; flowers small, short-pedicelled, pendulous. *Calyx* laxly campanulate, 5-angled or -winged, posterior wing often larger produced at the base; lobes 5, shorter or longer than the tube. *Corolla-tube* cylindric; limb 2-lipped; upper lip very small, lower broad, rounded or shortly 3-lobed, blue with 2 yellow marks. *Stamens* 4 perfect, included; anthers approximated by pairs, 2-celled; cells short, divaricate, early confluent. *Ovary* ovoid, glabrous; disc short, cylindric; style longer than the ovary, glabrous, stigma obliquely dilated obscurely 2-lobed; placentæ deeply inflexed, each divided into 2 thick plates, bearing ovules on all sides. *Capsule* included in the calyx, broadly ellipsoid, loculicidal, 2-valved. *Seeds* ellipsoid, truncate at both ends, minutely striate, more or less reticulated.—Species 3 in India, 1 in Mexico.

1. **K. Notoniana,** *A. DC. Prodr.* ix. 276; leaves minutely scabrous-pubescent, posterior wing of the calyx larger produced at the base, lobes shorter than the tube, lower lip of the corolla ⅓–⅔ in. diam. *Wight Ic.* t. 1353, and *Ill.* t. 159 *bis*, fig. 4; *Gardn. in Calc. Journ. Nat. Hist.* vi. 487. Wulfenia Notoniana, *Wall. Cat.* 409; *Tent. Fl. Nep.* 46, *obs.* Glossanthus malabaricus, *Klein*; *Benth. Scroph. Ind.* 57; *Wall. Cat.* 6394. G. Notoniana, *Br. in Benn. Pl. Jav. Rar.* 121. Rhynchoglossum obliquum, *Hohenacker*, n. 1165.

S. DECCAN PENINSULA and CEYLON, alt. 2–5000 ft., frequent, *Wight, Thwaites,* &c.

Annual, 12–18 in., usually with a line of hairs down the stem on one side. *Leaves* 5–8 in.; petiole ¼–2 in. *Peduncles* ½–2 in., racemes often 4 in. *Calyx* ⅙ in., somewhat enlarged in fruit; lobes $\frac{1}{16}$ in., triangular, mucronate. *Corolla-tube* ⅓ in., white; lower lip blue, yellow near the two hooded depressions at its base. *Capsule* ⅙ in. diam.

VAR. *glabra*; glabrous, leaves more membranous, flowers smaller. K. glabra, *Gardn. in Calc. Journ. Nat. Hist.* vi. 489.—Ceylon; alt. 4–5000 ft., *Walker,* &c.—Even the pedicels are glabrous.

VAR. *scabra*; leaves minutely scabrous not pubescent beneath, flowers capsules and seeds rather smaller than in *K. Notoniana* type. K. scabra, *Dalz. & Gibs. Bomb. Fl.* 134. Rhyncoglossum scabrum, *Dalz. in Hook. Kew Journ.* ii. 140.—Mts. of S. Deccan Peninsula and Ceylon; *Dalzell, Johnstone, Walker.*

2. **K. zeylanica,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 490; leaves pubescent, calyx subequally 5-winged lobes longer than the tube remarkably acuminate, lower lip of corolla more than ½ in. diam. *A. DC. Prodr.* ix. 276, *name only.* K. Notoniana, *Bot. Mag.* t. 4620. Glossanthus zeylanicus, *Br. in Benn. Pl. Jav. Rar.* 121, *name only.*

CEYLON; frequent near Kandy, *Gardner, Thwaites,* &c.

Doubtfully distinct from *K. Notoniana* (ex Thwaites Enum. 208); but seems well separable by the long and remarkably acuminate calyx-lobes; the pubescence also is often stellate.

3. **K. ampliata;** leaves glabrate, calyx subequally 5-winged lobes as long as the tube lanceolate, bracteoles persistent conspicuous.

UPPER ASSAM; Mishmee Hills, near Yen, *Griffith* (Kew Distrib. n. 3846).

Stem at least a foot. *Leaves* 6 by 3 in.; petiole ⅓–1½ in. *Peduncles* ½ in.; racemes 3 in., scarcely puberulous; bracteoles ⅓ in. and upwards; pedicels 0–⅛ in. *Calyx* (in fruit) ½ in., broadly cylindric. *Capsule* and *seeds* nearly as of *K. Notoniana.*—Corolla not seen: the species resembles *K. Notoniana,* but is larger in all its parts.

XVI. RHYNCHOGLOSSUM, *Blume.*

Herbs, minutely scabrid-pubescent or nearly glabrous. *Leaves* alternate, elliptic, acuminate, unequal-sided, cordate on one side of the unequal base, subentire or sinuate. *Racemes* long, many-fld.; bracts 0; bracteoles minute. *Calyx* campanulate, 5-lobed half-way down. *Corolla-tube* cylindric, contracted at the mouth; limb 2-lipped; upper lip short bifid, lower lip longer, 3-lobed. *Stamens* 2 perfect, included; anthers connivent, 2-celled; cells ellipsoid, subparallel, slits ultimately subconfluent at the apex. *Ovary* ovoid; style linear, stigma minutely 2-lobed; placentæ deeply intruded, then bifid into 2 thick plates bearing ovules on all sides. *Capsule* included, ellipsoid, membranous, loculicidally 2-valved. *Seeds* narrowly ellipsoid, smooth; testa minutely reticulated.—Species 2, extending from India to the Philippines.

R. obliquum, *Blume Bijd.* 741; corolla ⅓ in. long, lower lip ovate 2–3 times longer than the upper. *DC. Prodr.* ix. 274. R. Blumei, *DC. l. c.* 274. Wulfenia intermedia, *Wall. Cat.* 408. Loxotis intermedia, *Benth. Scroph. Ind.* 57. L. obliqua, *Br. in Benn. Pl. Jav. Rar.* 102, t. 24.

TENASSERIM; at Moulmein, *Wallich, Parish,* &c. MALACCA; *Zippel.*—DISTRIB. Throughout the Malayan Archipelago.

A succulent, membranous herb, very variable in size; height 2–20 in. *Leaves* 1–⅚ in.; petiole ¼–2 in. *Racemes* 8 in., or sometimes depauperated and 1–3-fld.; bracteoles $\frac{1}{12}$–⅙ in., filiform. *Calyx* ⅓ in., somewhat enlarged in fruit; lobes lanceolate, sometimes very acuminate, sometimes subtriangular. *Corolla* blue and white, tube slightly incurved, as though hooded in the throat; 2 lateral lobes of the lower lip narrow falcate. *Capsule* ⅛ in. diam. *Seeds* not striated.

VAR. *parviflora*; lower lip of corolla narrower hardly twice as long as the upper. R. obliquum, *Wight Ill.* t. 159 *bis,* fig. 7; *Clarke Comm. & Cyrt. Beng.* t. 88. R. zeylanicum, *Bot. Mag.* t. 1498. Wulfenia obliqua, *Wall. Cat.* 407, and *Tent. Fl. Nep.* 45, t. 35. Loxotis obliqua, *Benth. Scroph. Ind.* 57.—*Rheede Hort. Mal.* ix. t. 80.—Throughout India; alt. 0–5000 ft., in and near the hills, very common; from Kumaon to Bhotan; in Chota Nagpore and Central India, and in the W. Deccan Peninsula, from Bombay to Ceylon.

XVII. JERDONIA, *Wight.*

A perennial, stemless herb. *Leaves* elliptic, reticulate; petiole long.

Scapes slender, few-fld.; bracts small. *Sepals* 5, lanceolate. *Corolla* pale lilac with red lines; tube elongate, swollen upwards; limb oblique, 2-lipped; lobes 5, ovate, obtuse, nearly equal. *Stamens* 4 perfect; filaments short, dilated upwards, 2 spurred; anthers connivent, cohering by their apices, 2-celled; cells ellipsoid, divergent at base, early divaricate and confluent. *Ovary* ovoid; disc annular; style linear, stigma small scarcely 2-lobed; placentæ 2-partite into 2 flat plates bearing ovules on both faces. *Capsule* broadly ovoid, acute, loculicidally 2-valved; placentæ scarcely altered in fruit. *Seeds* funicled, ellipsoid, subumbonate at the apex, smooth, testa striate coarsely reticulate.

J. indica, *Wight Ic.* t. 1352, and *Ill.* t. 159 *bis*, fig. 2; *Bot. Mag.* t. 5814.

S. DECCAN PENINSULA; Nilgherry and Anamally Hills, and Bolimputty near Coimbatore, *Wight.*

Stem 2 in., thick, creeping, upwards (with the innovations) rufous-hirsute or woolly. *Leaves* alternate, dense, $2\frac{1}{2}$ by 2 in., obtuse at both ends, entire, rufous-ciliate on the margin, mature glabrate above, rusty puberulous on the nerves beneath; petiole 2–4 in. *Scapes* 2–4 in., rufous-pilose; bracts $\frac{1}{10}$ in., sublinear; pedicels $\frac{1}{10}$–$\frac{1}{4}$ in., in fruit somewhat thickened upwards. *Sepals* $\frac{1}{10}$ in., rusty puberulous. *Corolla* $\frac{2}{3}$ in.; lobes $\frac{1}{5}$ in. diam. *Filaments* sparsely pilose. *Ovary* and style glabrous. *Capsule* $\frac{1}{6}$ in. long and broad.

XVIII. LEPTOBŒA, *Benth.*

Shrubs. *Leaves* opposite, often crowded. *Peduncles* filiform, lax, few-fld.; bracts small, linear; pedicels capillary. *Calyx* small, 5-fid. *Corolla* small, campanulate, slightly gibbous at the base, white; limb obscurely 2-lipped; lobes 5, subequal, round. *Stamens* 4 perfect, included; anther-cells ellipsoid, divergent at the base, ultimately confluent at the apex. *Ovary* sessile, ellipsoid; disc 0; style linear, stigma small subcapitate; placentæ deeply intruded, of 2 plates, bearing ovules on both faces. *Capsule* linear or oblong, septicidally 2-valved; margins of the valves inflexed bearing the placentæ, valves soon or late 2-partite. *Seeds* minute, ellipsoid, smooth.—Species 2, in N. and E. Bengal.

1. **L. multiflora,** *Gamble Darjeeling List*, 58; leaves elliptic acuminate at both ends pubescent, capsule $\frac{3}{4}$ in. linear 2-valved late or scarcely at all 4-valved. Championia multiflora, *Clarke Comm. & Cyrt. Beng.* t. 68.—Cyrtandracea n. 100, *Griff. Itin. Notes*, p. 107.

SIKKIM and BHOTAN, alt. 3000 ft., frequent; *Griffith, J. D. H.*, &c. ASSAM; *Griffith.* KHASIA MTS.; alt. 2000 ft., frequent.

A shrub, 2–6 ft. *Leaves* attaining 4 by $1\frac{1}{2}$ in., minutely crenulate, hairy on both surfaces or at least on the nerves beneath; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Peduncles* $\frac{1}{3}$–1 in., often several fascicled on shortened lateral branches, 1–5-fld., pubescent; bracts $\frac{1}{8}$ in., linear; pedicels $\frac{1}{3}$–$\frac{2}{3}$ in. *Calyx* $\frac{1}{12}$ in., persistent; teeth linear, pubescent. *Corolla* $\frac{1}{4}$ in., glabrous. *Ovary* minutely glandular; style glabrous, about as long as the ovary. *Capsule* glabrous, acute, beaked by the style; valves 2, often remaining attached at the apex or on one side (in the manner of *Loxocarpus*), ultimately again 2-partite.

2. **L. glabra;** glabrous, leaves elliptic acuminate at both ends, capsule $\frac{1}{3}$ in. oblong 2-valved nearly from the first 4-valved. Cheilosandra leptopus, *Griff. ms.*; *Benth. in Gen. Pl.* ii. 1025.

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3843).

A shrub, closely resembling *L. pubescens*, but altogether glabrous. *Petioles*

scarcely $\frac{1}{6}$ in. *Capsule* broadly oblong, subobtuse, early dehiscent from the apex into 4 obtuse vavles, very nearly as in *Bœica.*

XIX. **EPITHEMA,** *Blume.*

Small, succulent, pubescent herbs. *Leaves* few or solitary, lower alternate, upper often opposite. *Peduncles* 1 or several, in the upper axils, free or confluent with the petiole or leaf-base; bract large, solitary, 1-sided, hooded or subspathaceous; flowers in a dense scorpioid raceme; bracteoles small, narrow. *Calyx* campanulate; lobes 5, acute, valvate in bud. *Corolla* small, tubular, 2-lipped, blue or white; lobes 5, not very unequal. *Stamens* 2 perfect; anthers cohering, 2-celled; cells short, divaricate, early confluent. *Ovary* ovoid; disc 1-sided; style filiform, stigma small subcapitate; placentæ stalked, peltate, bearing ovules on all sides. *Capsule* globose, membranous, included, circumsciss. *Seeds* oblong or ellipsoid, subacute at both ends, smooth; cells of the testa elongate, often spiral.—Species 5 (or 1), from India to the Philippines, with 1 at Fernando Po.

E. carnosum, *Benth. Scroph. Ind.* p. 57; lower leaf petioled upper opposite nearly sessile sinuate-crenate thinly pubescent, bract rarely hooded, ovary densely pubescent at the apex, seeds narrowly oblong, cells of the testa nearly straight. *DC. Prodr.* ix. 278; *Clarke Comm. & Cyrt. Beng.* t. 90. Aikinia carnosa, *G. Don Gen. Syst.* iv. 665.—Epithema?, *Wall. Cat.* 9080.

E. SUBTROPICAL HIMALAYA, alt. 1–5000 ft., from Nepal to Bhotan, common; *Wallich*, &c. KHASIA MTS., alt. 500–4000 ft., frequent; *H.f. & T.*, &c.

Stem $\frac{1}{3}$–14 in. *Leaves* $\frac{1}{3}$–8 in., ovate-cordate, sparsely laxly villous above, paler nearly glabrous beneath except on the nerves; petiole of the alternate leaf often 2–4 in., of the subsessile leaves rarely $\frac{1}{2}$ in. *Peduncles* $\frac{1}{3}$–4 in., free or racemosely (not fasciculately) confluent with the petiole or leaf-base; bract $\frac{1}{3}$–$\frac{2}{3}$ in., truncate; pedicels 0–$\frac{1}{3}$ in.; raceme subincluded in the bract or not; bracteoles minute, linear. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in., hairy; lobes lanceolate or triangular with a linear point. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., with a ring of hairs within; lobes of the upper lip lanceolate, acute. *Capsule* $\frac{1}{12}$ in. diam.

VAR. *dentata*; leaves denticulate or sometimes subacutely doubly serrate.—Pegu and Tenasserim; Attaran, *Brandis*; Moulmein, *Parish*, &c.

VAR. *hispida*; leaves serrulate almost hispid above, seeds broadly oblong. E. ceylanicum, *Wight Ill.* t. 159 *bis*, fig. 3, and *Ic.* t. 1354; *Dalz. & Gibs. Bomb. Fl.* 135.—S. Deccan Peninsula; Courtallum, *Wight*; Nilgherries, *Thomson*; Concan, *Dalz ll*, &c.

VAR. *zeylanica*; calyx larger, seeds twice as heavy as those of *E. carnosum* type. E. zeylanica, *Gardn. in Calc. Journ. Nat. Hist.* vi. 492. E. carnosum, *Thwaites Enum.* 208.—Ceylon; in the Central Province up to 4000 ft., common; *Gardner*, &c.

VAR. *pusilla*; small, nearly glabrous, calyx and ovary nearly glabrous, seeds spirally marked by the long cells of the testa.—Bombay?; *Stocks.*

XX. **MONOPHYLLÆA,** *Br.*

Succulent herbs; stem simple, having one leaf and several peduncles at the apex. *Leaf* large, sessile, cordate-ovate, entire. *Racemes* lax or dense, simple or divided; bract 0; bracteoles minute. *Sepals* small, round-ovate, imbricate in bud. *Corolla* small; tube cylindric or short; limb 2-lipped, lobes 5. *Stamens* 4, perfect, filaments short; anthers adherent. *Disc* annular. *Ovary* ovoid, glabrous; style short, linear, stigma sub-

capitate; placentæ deeply inflexed, then recurved bearing the ovules. *Capsule* membranous, included, irregularly breaking up; placentæ left in the centre. *Seeds* ellipsoid, smooth, striated, reticulated.—Species 5, Malayan.

M. Horsfieldii, *Br. in Benn. Pl. Jav. Rar.* p. 121; leaf nearly glabrous, racemes lax, corolla-tube longer than the calyx. *DC. Prodr.* ix. 274.

MALAYAN PENINSULA; Klang in Selangore, *Beccari.*—DISTRIB. Java, Sumatra.

Stem 4 in. *Leaf* 6–8 in. diam., membranous. *Peduncles* 2–5, 1–4 in., nearly glabrous; racemes simple or divided, $\frac{1}{2}$–4 in.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., lower often distant, paired or fascicled. *Sepals* $\frac{1}{10}$ in., glabrous, slightly enlarged in fruit. *Corolla* $\frac{1}{3}$ in. *Anthers* ovate, 2-celled; cells soon confluent at the apex; filaments scabrid-glandular at the apex, not toothed. *Style* subpersistent, exserted from the calyx in young fruit.

XXI. CYRTANDROMŒA, *Zoll.*

Undershrubs, thinly pubescent. *Leaves* opposite, subequal or (in non-Indian species) sometimes unequal, elliptic or oblong, acuminate at both ends, serrate. *Racemes* axillary, small, 1- or few-fld., or elongate many-fld.; pedicels 1-bracteate at base, 2-bracteolate near the middle; bracts and bracteoles small, linear. *Calyx* tubular, 5-ribbed, 5-toothed; in fruit enlarged, membranous, subtruncate. *Corolla* large, white, sometimes with yellow lines in the throat within, glabrous; tube nearly straight; lobes 5, subequal, round, patent. *Stamens* 4, perfect, included, filaments linear; anther-cells 2, oblong, divergent at base. *Disc* obscure. *Ovary* 1-celled (2-celled near the base); placentæ nearly meeting in its axis, not there bearing ovules, then recurved ovuliferous; style elongate, stigma of two semicircular plates. *Capsule* included in the inflated calyx, ellipsoid, papery, irregularly breaking up or loculicidal; placentæ early free forming a 4-pointed column covered by seeds on all sides. *Seeds* subglobose, testa strongly reticulated by subquadrate cells.—Species 8, Malayan.

1. **C. decurrens,** *Zoll. Syst. Verz. Ind. Arch.* i. 58; leaves elliptic acuminate base much decurrent, racemes many-fld., calyx glabrous, capsule irregularly breaking up. Loxonia? decurrens, *Blume Bijd.* 776; *DC. Prodr.* ix. 277. Busea decurrens, *Miq. Fl. Ind. Bat.* ii. 733. Cyrtandra acuminata, *Kurz in Trimen. Journ. Bot.* 1875, 329, *not of Wall.*

NICOBAR; *Kurz.*—DISTRIB. Java.

A nearly glabrous undershrub, 3–6 ft. high; stem little-divided, leafy at the top. *Leaves* 6 in., serrate nearly from the base; nerves 17–20 pair; petiole hardly any by reason of the much decurrent leaf-base. *Racemes* abbreviated, few-fld., or attaining $3\frac{1}{2}$ in., 20-fld., pendulous; pedicels $\frac{2}{3}$ in.; bracteoles $\frac{1}{3}$ in., linear, glabrous. *Calyx* $\frac{1}{3}$ in., corolloid, white or tinged orange; in fruit $\frac{3}{4}$–1 in., reticulate. *Corolla* $1\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.—Zollinger's specimen agrees with Kurz's Nicobar plant; but his description perhaps includes *C. acuminata* as well as *C. decurrens.*

2. **C. acuminata,** *Benth. in Gen. Pl.* ii. 1020; leaves elliptic acuminate, peduncles 1-fld. shorter than the petioles, capsule loculicidal 2-valved. Cyrtandra? acuminata, *Wall. Cat.* 1808; *DC. Prodr.* ix. 285, *name only*; *not of Kurz.* Busea subsessilis, *Miq. Fl. Ind. Bat.* ii. 734.

PENANG; *Wallich, Porter.* SINGAPORE; *Maingay, Lobb.*—DISTRIB. Sumatra.

An undershrub, 3 ft. high. *Leaves* 4–6 in., serrate nearly from the base, mature sparsely pubescent; nerves 10 pair; petiole $\frac{3}{4}$ in. *Peduncles* pubescent; bracteoles $\frac{1}{6}$ in., linear. *Calyx* $\frac{1}{3}$ in., 5-ribbed, minutely pubescent; in fruit $\frac{3}{4}$ in., reticulate. *Corolla* $1\frac{1}{4}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., dehiscing from the apex so as to split the style-base.

3. **C. cymulosa,** *Clarke*; leaves elliptic acuminate petioled, cymes small 1–5-fld. subsessile, calyx nearly glabrous, capsule breaking up irregularly.

TENASSERIM; at Mergui, *Griffith, Helfer* (Kew Distrib. n. 3827).

Leaves 8 by 3½ in., nearly glabrous, narrowed at the base; nerves 10 pair; petiole ⅓–⅔ in. *Cymes* scarcely ⅔ in., appearing sessile on weak axillary spurs, pubescent. Otherwise as *C. decurrens*, from which it differs in the petioled, much less-nerved leaves.

4. **C. grandiflora,** *Clarke*; leaves petioled elliptic acuminate, peduncles 1–2-fld. with the pedicels nearly 1 in., flowering calyx ¾ in. minutely pubescent.

TENASSERIM; at Moulmein, *Lobb*.

Branch terete, shortly fulvous-pubescent. *Leaves* 6 by 2 in., both ends much acuminate, serrate, minutely pubescent; nerves 9 pair; petiole ⅔ in. *Corolla* 2¼ in. *Capsule* (and fruit-calyx) as of *C. decurrens*, not perfectly ripe, so that it is not certain whether it opens by valves.

XXII. STAURANTHERA, *Benth.*

Low, succulent, pubescent herbs. *Leaves* alternate, or opposite one of each pair reduced to a small auricle, falcate, elliptic, acuminate, very unequal-sided. *Cymes* peduncled, lax, subracemose; bracts small. *Calyx* wide-campanulate; lobes 5, wide-spreading, subplicate. *Corolla* campanulate, spurred or gibbous at the base, somewhat 2-lipped; lobes 5, subequal. *Stamens* 4 perfect, filaments short; anthers 2-celled, cohering crosswise into a depressed cone; cells diverging at the base, dehiscing on the inner face by slits ultimately confluent at the apex. *Disc* 0. *Ovary* sessile, subglobose; style short, stigma broad, margin sublobed; placentæ deeply inflexed, bifid, branches lobed, bearing ovules on both sides. *Capsule* depressed-globose, overtopped by the calyx, papery, transversely or irregularly breaking up. *Seeds* minute, obovoid, smooth; testa reticulated, cells often spiral.—Species 4, from Assam and Chittagong to Java and Celebes.

1. **S. umbrosa,** *Clarke Comm. & Cyrt. Beng.* t. 89; leaves alternate, corolla ¼–⅓ in. gibbous not spurred at the base. Cyananthus umbrosa, *Griff. Notul.* iv. 154, and *Ic. Pl. Ind. Or.* t. 437.

UPPER ASSAM; Gubroo Hills, *Griffith* (Kew Distrib. n. 3845).—DISTRIB. Ava.

Stem 4–12 in., occasionally branched, dusky-pubescent. *Leaves* attaining 8 by 3 in., obscurely crenate, glabrate above, fuscous-pubescent (at least on the nerves) beneath; petiole ⅛–½ in. *Peduncles* ¾–1½ in.; cymes 2–3 in., dusky-pubescent; pedicels ¼–½ in. *Calyx* ⅓–½ in. diam., lobed half-way down; lobes triangular. *Corolla* white, with blue marks, yellow near the base within. *Ovary* pubescent. *Capsule* circumsciss near the base (*Griffith*); placentæ fungose (*Griffith*), but are in the dried state thin.

2. **S. grandiflora,** *Benth. Scroph. Ind.* 57 (by misprint *grandifolia*); leaves opposite, corolla 1 in. spurred at the base. S. grandifolia, *Br. in Benn. Pl. Jav. Rar.* 121; *DC. Prodr.* ix. 278; *Bot. Mag.* t. 5409; *Clarke Comm. & Cyrt. Beng.* t. 89 *bis*. Glossanthus grandiflorus, *Benth. in Wall. Cat.* 6395.

PENANG; *Wallich*. CHITTAGONG HILLS; *Clarke*. MOULMEIN; *Parish*.

Stem 4–12 in., dusky-pubescent. *Leaves* attaining 10 by 4½ in., obscurely toothed, mature nearly glabrate except on the nerves beneath; petiole ⅓–1 in. *Inflorescence* and *calyx* nearly as in *S. umbrosa*. *Corolla* blue, with yellow marks in the tube within; spur ⅓ in. *Ovary* thinly pubescent or glabrous. *Capsule* ⅓ in.

broad, breaking up irregularly.—The examples from the Chittagong Hills (without flowers) are more hairy, the leaves beneath closely grey-pilose.

S. ? Brandisii; leaves alternate, pedicels long fascicled in abbreviated cymes, calyx narrow, capsule small longer than broad.

PEGU; Thoungyun, *Brandis.*

Stem creeping at the base; innovations rusty-silkily woolly. *Leaves* 7 by 4 in., shortly acute, very unequal-sided, somewhat thick, glabrate above, rusty-villous beneath; petiole $\frac{1}{3}$ in. *Pedicels* in fruit $\frac{1}{3}$–$\frac{3}{4}$ in., glabrous; bracts $\frac{2}{3}$ by $\frac{1}{8}$ in., oblong, obtuse, nearly glabrous. *Sepals* in fruit $\frac{1}{5}$ by $\frac{1}{8}$ in., elliptic, acute, imbricate, shortly united at the base, nearly glabrous. *Capsule* $\frac{1}{3}$ by $\frac{1}{10}$ in., acute, glabrous, papery, indehiscent; placentæ deeply intruded, bifid, branched; plates thin, bearing ovules on both sides. *Seeds* minute, obovoid, smooth.—Probably a new genus, but the flowers are unknown; the leaves are much like those of *Stauranthera umbrosa*; the inflorescence, bracts, calyx and capsule do not suit *Stauranthera*, but *Rhynchotechum.*

XXIII. ISANTHERA, *Nees.*

Small, nearly simple, undershrubs; innovations tawny, silkily woolly. *Leaves* all alternate, broadly oblanceolate, acuminate at both ends. *Cymes* axillary, short-peduncled, towards the end of the stem; bracts narrow. *Sepals* 5, small, narrow. *Corolla* small, shortly campanulate, obscurely 2-lipped; lobes 5, ovate. *Stamens* 4 fertile (sometimes 5 fide Nees); filaments short; anthers small, subquadrate, 2-celled, slits marginal, finally confluent at the subemarginate apex. *Disc* very small or 0. *Ovary* ovoid, sessile; style shorter than the ovary, stigma small simple; placentas deeply inflexed, then bifid recurved bearing the ovules. *Berry* small, ovoid or subglobose, fleshy, indehiscent or (fide Gardner) ultimately 2-valved. *Seeds* very small, ellipsoid, smooth.—Species 3, in India, Malaya and the Philippines.

A genus which should perhaps be merged in Rhynchotechum; differing in having no opposite leaves, a shorter style, and the anthers dehiscent exactly on the margins.

I. permollis, *Nees in Trans. Linn. Soc.* 17, p. 82; leaves nearly entire, nerves 11–19 pair, cymes short-peduncled dense. *Wall. Cat.* 9073; *DC. Prodr.* ix. 279; *Wight Ill.* t. 159 b, fig. 5, and *Ic.* t. 1355. I. floribunda, *Gardn. in Calc. Journ. Nat. Hist.* vi. 483. Cyrtandra ? lanuginosa, *R. Br. in Wall. Cat.* 7131.

S. MADRAS, *Heyne*; Nilgherries and Courtallum, *Wight*, &c. CEYLON, up to 4000 ft. alt.; *Gardner, Thwaites*, &c.

Stem 8–12 in. *Leaves* attaining $9\frac{1}{2}$ by 4 in.; mature glabrous above, more or less tawny and woolly beneath; petiole $\frac{1}{3}$–1 in. *Peduncles* scarcely as long as the petioles; cymes $\frac{1}{2}$–$1\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{8}$ in., silky, finally nearly glabrous. *Corolla* [1] in., white. *Berry* $\frac{1}{4}$ by $\frac{1}{5}$ in.—In Wight's figures the anthers are depicted from an example past flower.

VAR. ? *paucinerva*; nerves of the leaves 6–8 pair.—Mergui; *Griffith* (in Herb. Wight).—This might be suspected a misplaced ticket; but out of the abundant Ceylon material, none has few-nerved leaves resembling this.

XXIV. RHYNCHOTECHUM, *Blume.*

Erect, simple undershrubs; innovations tawny, silkily woolly. *Leaves* opposite or lower alternate, usually large. *Cymes* in the lower axils, manyfld., trichotomous or umbellately compound; bracts narrow, inconspicuous.

Sepals 5, small, narrow. *Corolla* small, subcampanulate, purple-rose or white; limb obscurely 2-lipped; lobes 5, subequal, round. *Stamens* 4 perfect, attached near the base of the corolla, filaments short linear curved; anther-cells 2, subparallel below, dehiscent on the inner face, completely confluent at the apex. *Disc* 0 or very small annular. *Ovary* sessile, ovoid; style linear elongate, stigma small; placentæ nearly meeting in the axis of the ovary, there naked, then recurved bearing the ovules. *Berry* small, globose, apiculate, glistening white, pulpy. *Seeds* very small, ellipsoid, smooth.—Species 8, from Bengal through Malaya to the Philippines.

1. **R. parviflorum,** *Blume Bijd.* p. 775; leaves broadly oblanceolate serrate mature glabrate except on the nerves beneath, sepals softly tawny-villous, corolla very small, ovary upwards densely shortly hairy.

JAVA; frequent.

VAR. ? *penangensis*; sepals caudate-acuminate tawny silky in fruit, corolla exceeding the sepals.—PENANG.—The material is a stem with flowers and half-ripe fruit, but no leaves, which has been doubtfully referred to *R. ellipticum*, from which it differs in the indumentum, and the minutely hairy ovary. It is either a large-fld. var. of *R. parviflorum*, or a species nearly allied to it. The peduncles are all opposite at the nodes; in the Java *R. parviflorum* the lower leaves and peduncles are frequently alternate.

2. **R. ellipticum,** *A. DC. Prodr.* ix. 285, *in note*; leaves broadly elliptic or obovate acute minutely dentate mature glabrous above, sepals after flowering patently pilose, corolla ¼ in., ovary glabrous or with very few gland-tipped hairs. *Bot. Mag.* t. 5832; *Clarke Comm. & Cyrt. Beng.* t. 91. Corysanthera elliptica, *Wall. Cat.* 6411.—Cyrtandracea, *Griff. Ic. Pl. Asiat.* t. 439.

SIKKIM, BHOTAN, ASSAM, KHASIA MTS., CACHAR and SILHET; alt. 0–3500 ft. in or near the hills, frequent.

Stem 2–4 ft., thick, cinnamoneous, tomentose or woolly at the apex. *Leaves* opposite, 6½ by 3½ in. (often larger), base cuneate, somewhat coriaceous, whitened beneath, above tawny, silkily woolly, afterwards glabrate, beneath densely cinnamoneous-woolly, afterwards glabrous except the nerves; nerves 15–20 pair, subparallel; petiole ⅓–1½ in. *Peduncles* ¼–1½ in., often 2–4 together (or the peduncle divided from the base), when young tawny-silky, divaricately often umbellately divided. *Sepals* ⅙ in., narrowly lanceolate, mature squamous or scabrous from the thick spreading hairs, often corolloid, rose. *Corolla* rose-purple, minutely hairy without. *Berry* ¼ in. diam.

VAR. *pilosior*; mature leaves above with close short white hairs, sepals patently hispid.—Darjeeling; alt. 3500 ft., *Clarke.*

VAR. *angusta*; leaves narrowly elongate-lanceolate (sometimes 10 by 1⅓ in.), nerves 10–15 pair.—Cachar; *H. f. & T., Keenan.* MARTABAN; *Parish.*—Possibly a distinct species; see *Hook. f. in Bot. Mag.* t. 5832.

VAR. *Hookeri*; leaves oblong, cymes very dense repeatedly trichotomous.—Chittagong; Seetakoond, alt. 1000 ft., *H. f. & T.*; Demagri, alt. 250 ft., *Clarke.*—Probably only the full form of the preceding variety *angusta.*

3. **R. vestitum,** *H. f. & T.*; *Clarke Comm. & Cyrt. Beng.* t. 92; leaves elliptic acuminate at both ends slightly dentate hirsute on both surfaces, inflorescence very hirsute, corolla ¼–⅓ in., ovary glabrous or nearly so. Corisanthera vestita, *Griff. Itin. Notes*, 124, n. 426.

SIKKIM and BHOTAN HIMALAYA, ASSAM, KHASIA MTS., alt. 1–3000 ft., not rare; *Griffith, H. f. & T.*, &c.

Stem 3 ft., thick, patently hispid upwards. *Leaves* opposite, 9 by 2¾ in., hirsute above with long yellow hairs rising from tubercles, more softly hairy beneath; petiole

1 in. *Peduncles* ½–1 in. *Sepals* ¼ in., narrowly lanceolate, patently hispid like the leaves. *Flowers* and berries as of *R. ellipticum*, but a little larger.

4. **R. latifolium,** *H. f. & T.*; *Clarke Comm. & Cyrt. Beng.* t. 94; leaves oblanceolate or obovate acuminate at both ends subdenticulate mature glabrous above more or less tawny and silkily woolly beneath, cyme 4–6 in. diam. very divaricate compound silkily woolly. Chelone latifolia, *Ham. in Herb. Wall.* Chiliandra obovata, *Griff. Notul.* iv. 150, and *Ic. Pl. Asiat.* t. 438.

ASSAM, *Wallich, Griffith*; Mishmee Hills, *Griffith.*—DISTRIB. Ava.

Stem thick, silkily woolly upwards. *Leaves* opposite, 8 by 3 in. (sometimes obovate larger); petiole 1 in. *Peduncles* 2 in., stout; cyme umbellately decompound, many- (sometimes 150-) fld. *Sepals* ⅛ in., narrowly lanceolate. *Corolla* hardly longer than the calyx, white with the upper lip purple (Griffith). *Berry* ¼ in. diam. when dry.

5. **R. alternifolium,** *Clarke*; leaves (except the uppermost pair) alternate elongate elliptic acuminate at both ends denticulate mature nearly glabrous except the nerves, cymes peduncled compound tawny silky.—Corisanthera sp., *Griff. ms.*

UPPER ASSAM; Brahmakoond, *Griffith.*

Stem upwards (with the innovations) cinnamoneous, silkily woolly. *Leaves* of the uppermost pair one 7½ by 2½ in., the other 2¼ by ¾ in.; petiole 1½ in. *Peduncles* 1 in.; inflorescence much as of *R. latifolium*, but less divaricate. *Corolla* distinctly 2-lipped, upper lip longer less deeply divided. *Anthers* largeish, dehiscent on the inner face, minutely glandular at the apex, slits early confluent at the apex. *Style* very long.—This species (with some other Malay plants) entirely annuls the simple distinction given in the Gen. Plant. between *Rhynchotechum* and *Isanthera* of "leaves opposite" and "leaves alternate;" except for the alternate leaves and peduncles it is altogether a *Rhynchotechum.*

6. **R. calycinum,** *Clarke*; glabrate in fruit, leaves elongate-elliptic nearly entire, cymes short-peduncled very dense, sepals lanceolate prominent.

UPPER ASSAM ?; "on the Soondra bank."

Stem very thick. *Leaves* all opposite, 10 by 3½ in., narrowed at both ends, subcoriaceous, not seen young; petiole 2 in. *Peduncles* 1 in., 2–5-clustered; cymes in fruit subcapitate, very many-fld., glabrate; bracts ¼ in., oblong. *Sepals* ¼ in. *Corolla* not seen. *Berry* small, glabrous.

XXV. CYRTANDRA, *Forst.*

Shrubs or trees. *Leaves* opposite, equal or unequal, or one of each pair rudimentary or wanting. *Flowers* in cymes or heads, peduncled or sessile, axillary; bracts often large or connate into an involucre. *Calyx* free, ovoid or tubular, diciduous or persistent; teeth 5, acute. *Corolla* tubular-funnel-shaped; lobes 5, round, spreading, subequal (in the Indian species). *Stamens* 2 perfect. 2 or 3 rudimentary; anthers included (in the Indian species) 2-celled; cells broad-oblong, subparallel, slits longitudinal. *Disc* annular, or (in non-Indian species) unilateral subquadrate. *Ovary* superior; style long or short, stigma shortly 2-lobed; placentæ nearly meeting, then revolute. *Berry* fleshy, ovoid oblong or linear, usually white. *Seeds* very many, minute, ellipsoid, smooth, testa obscurely reticulated.—Species 160, Malayan and Polynesian, from Penang to the Sandwich Islands.

1. **C. dispar,** *DC. Prodr.* ix. 282; leaves apparently alternate petioled lanceolate-obovate, peduncles short, pedicels umbelled, calyx persistent. C. frutescens, *Wall. Cat.* 807 *partly, not of Jack.*

PENANG; *Wallich, Maingay.*—DISTRIB. Sumatra.

A shrub; branchlets tessellated with imbricate whitened scales, somewhat quadrangular. *Leaves* opposite, one of the pair reduced to a linear rudiment of the petiole or 0; the other 8 by 3 in., acuminate, base cuneate, glabrate except the rufous-villous nerves beneath; petiole ½–1 in. *Peduncles* 0–¼ in.; bracts ¼ in., lanceolate; pedicels 3–8, ⅓–⅔ in. *Calyx* ⅓ in., fulvous-hirsute, lobed half-way down. *Corolla-tube* ½ in., slightly curved, fulvous-hirsute without; limb nearly equally 5-lobed. *Disc* unilateral, quadrangular. *Ovary* fulvous-pubescent. *Berry* ½ in., elongate ellipsoid, tipped by the style-base.

2. **C. pilosa,** *Blume Bijd.* 770; leaves opposite subequal sessile obovate-lanceolate, villous above, peduncles very short, flowers involucred capitate, calyx deciduous. *DC. Prodr.* ix. 282.

TENASSERIM; *Helfer.* SINGAPORE; *Lobb.*—DISTRIB. Java, Sumatra.

A shrub; branchlets 4-angled; innovations rufous silky. *Leaves* 7 by 3½ in., acute, base narrowed, closely serrate; nerves beneath fulvous-villous. *Peduncles* scarcely ⅙ in.; bracts 1 in., united into a spathaceous involucre, deciduous. *Calyx* ½ in., lobed about half-way down, rufous-hairy. *Corolla-tube* 1 in., straight, fulvous-silky without, dirty yellow. *Ovary* and style hairy. *Berry* ⅔ in., elongate ellipsoid, beaked by the style-base, tessellated externally (in the dried state).

3. **C. decurrens,** *De Vriese Pl. Ind. Bat. Reinw.* 14; leaves opposite subequal subsessile obovate-lanceolate glabrous above, peduncles very short, flowers involucrate capitate. C. frutescens, *Wall. Cat.* 807 *partly, not of Jack.*

PENANG; *Wallich.*—DISTRIB. Malaya to Borneo.

Hardly specifically separable from *C. pilosa.* The leaves, even in their young stage, are glabrous on the upper surface, and have the lateral nerves more oblique the midrib.

4. **C. bicolor,** *Jack in Trans. Linn. Soc.* xiv. 27; leaves opposite (one usually reduced to a rudiment) long-petioled elliptic, peduncles short deflexed, flowers capitate, calyx deciduous. *DC. Prodr.* ix. 281.

MALACCA; *Maingay.*—DISTRIB. Sumatra.

An undershrub; stem short, simple, stout; innovations closely fulvous-villous. *Leaves* 8 by 5 in., base obtuse, rounded or shortly cordate, coriaceous, mature fulvous-silky beneath or ultimately glabrate except on the nerves; petiole 4 in. *Peduncles* 1–2 in.; bracts ⅔ in., united into a spathaceous involucre, deciduous. *Calyx* ½ in., rufous-hairy; lobes ⅙ in., lanceolate. *Corolla* 1½ in., fulvous-silky without, pale-yellow purple-spotted within (*Maingay*). *Anthers* broadly oblong, minutely pilose at both ends. *Disc* annular. *Ovary* and style glabrous. *Berry* ½ in., narrowly ovoid-cylindric.—*C. Blumeana* of the Javan botanists, figured (as *C. pendula,* Blume) in Hook. Ic. Pl. t. 736, is common in Java, and perhaps does not specifically differ; it has white flowers, and the leaves more glabrous beneath.

5. **C. humilis,** *Blume Bijd.* p. 769; leaves opposite (one often reduced to a rudiment) long-petioled elliptic acute, peduncles hardly any, heads involucrate, calyx tubular deciduous. *DC. Prodr.* 9, p. 281.

SINGAPORE; *Prince* (Ic. Ined. Kew).—DISTRIB. Java.

Scarcely differs from *C. bicolor.* The leaves are often rhomboid or crenate at the base, the peduncles very short not decurved.

ORDER CVII. BIGNONIACEÆ. (By C. B. Clarke.)

Trees (*Nyctocalos* a large climber, *Amphicome* a herb). *Leaves* opposite, rarely whorled (in *Amphicome* alternate), 1–2–3-pinnate or sometimes undivided. *Panicles* or racemes terminal, rarely on short lateral branches; bracts inconspicuous; flowers showy, hermaphrodite, irregular. *Calyx* gamosepalous, campanulate (in the Indian species), valvate, spathaceous or 2–5-lobed. *Corolla* tubular-ventricose; mouth 2-lipped; lobes 5, subequal or slightly unequal, bilabiately imbricate in the bud. *Stamens* 4, didynamous, rudiment of the fifth often present (5 subequal in *Oroxylum*); inserted at the point where the corolla-tube is suddenly swollen; filaments linear, glabrous or hairy only at the base; anthers 2-celled, included or rarely shortly exserted; cells elliptic or narrowly oblong, dehiscing by longitudinal slits, parallel or divaricate. *Disc* usually cushion-like or annular. *Ovary* subsessile, 2-celled; style long glabrous, stigma of 2 elliptic lobes; ovules in many rows (in *Amphicome* in 1–2 rows) grouped in a double series in each cell, anatropous. *Capsule* mostly elongate, loculicidally or septicidally 2-valved; septum in fruit enlarged, deciduous together with the placentæ. *Seeds* compressed discoid (rarely subtrigonous) prominently winged, exalbuminous.—Species 450, in the tropics of the whole world, a few in the warm temperate zones of both hemispheres.

Herb. Leaves alternate, 1-pinnate . . . . 11. AMPHICOME.
Large climber. Leaves opposite, trifoliolate . . . . . . 1. NYCTOCALOS.
Tree. Leaves opposite, 2–3-pinnate. Stamens 5 perfect . 3. OROXYLUM.
Trees. Leaves opposite. Stamens 4 perfect.

* *Leaves undivided.*

Leaves narrowly oblong, glabrous . . . . 4. TECOMA.
Leaves roundly ovate, pubescent . . . . 10. DIPLANTHERA.

** *Leaves* 1–2-*pinnate.*

Calyx large. Capsule winged . . . . 9. PAJANELIA.
Calyx spathaceous, cleft to the base on one side . . . . . 5. DOLICHANDRONE.
Calyx irregularly 3–5-lobed . . . . 6. HETEROPHRAGMA.
Calyx shortly lobed or truncate. Septum of the capsule cylindric, spongy . . . . 8. STEREOSPERMUM.

**** *Leaves* 2–3-*pinnate.*

Corolla-tube narrowly linear, very long . . . . 2. MILLINGTONIA.
Corolla-tube cylindric-ventricose . . . . 7. MAYODENDRON.

Bignonia macrostachya, læta and *glauca*, Wall. Cat. 6504, 6505, 6506, were collected in Ava, not in British India. *Bignonia oxyphylla*, DC. Prodr. ix. 169, is said to be from India in Wallich's Herbarium. There is no plant under that name now in Wallich's Herbarium, nor is it likely that any tree of the genus Bignonia is wild in India.

I. NYCTOCALOS, *Teysm. & Binn.*

Large glabrous climbers. *Leaves* opposite, 3-foliolate; leaflets petioled, entire. *Peduncle* terminal, long, few-fld. *Calyx* tubular-campanulate, truncate or with 5 short teeth. *Corolla* large, white; tube very long; segments 5, round. *Stamens* (in the Assam species) 4, didynamous,

attached near the top of the corolla-tube; anther-cells distinct, narrowly oblong, pendulous. *Capsule* oblong, flattened parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid, completely surrounded (except at their base) by a hyaline entire wing.—Species 3, 2 in Malaya, 1 in Assam.

The Malay species, on which the genus is founded, are described and figured with 5 fertile stamens, having the anther-cells combined. The Assam species constitutes a marked sub-genus.

N. Thomsoni; *Hook. f. Bot. Mag.* t. 5678.

ASSAM; Gowhatty Hills, *Jenkins*; Mikir Hills, *Simons*.

Leaflets 6 by 3 in., broadly elliptic, caudate-acuminate, rhomboid at the base; petiolule ½–2 in.; petiole 4 in. *Peduncles* 6 in.; bracts ⅛ in.; pedicels 6, ¼ in. *Calyx* ⅓ by ⅓ in.; teeth 5, $\frac{1}{10}$ in., linear. *Corolla-tube* 7 by ⅙ in., mouth 2½ in. diam. *Anthers* subexsert, yellow; connective minutely mucronate; rudiment of the fifth stamen present. *Disc* small, cushion-like. *Style* 7 in.; stigma tongue-shaped, subcapitate. *Capsule* 6 by 2 in.; valves leathery, almost woody; septum ultimately free, simple, flat. *Seeds* ⅓–½ in. diam., or including the wing 1 in. diam.; those attached on opposite margins of the septum much overlapping.

II. MILLINGTONIA, *Linn. f.*

An erect tree; bark corky. *Leaves* opposite, 2–3-pinnate. *Panicles* many-fld., terminal on the pendent branches. *Calyx* small, campanulate; teeth 5, obscure. *Corolla* white; tube long, slender; lobes 5, subequal, ovate, acute, subvalvate. *Anthers* of 1 ovate cell, the second cell appearing as a small hook. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid; wing hyaline, broad.

M. hortensis, *Linn. f. Suppl.* 291; *DC. Prodr.* ix. 182; *Wight Ill.* 161 *bis*, fig. 6, *bad*; *Bureau Monogr. Bign.* t. 8; *Bedd. Fl. Sylv.* t. 249 (*anthers wrong*); *Brand. For. Fl.* 347; *Kurz For. Fl.* ii. 238. Bignonia Azedarachta, *Koen. Ann. Bot.* i. 178. B. suberosa, *Roxb. Cor. Pl.* iii. 11, t. 214, and *Fl. Ind.* iii. 111; *Wall. Cat.* 6513.

BURMA; in the tropical forests from Ava to Tenasserim, fide *Kurz*.—DISTRIB. Planted extensively in India, and in other tropical countries. Perhaps wild also in Central India and on the Upper Godavery.

An erect tree, 80 ft., lanceolate in outline, branches drooping. *Leaves* 2–3 ft.; leaflets 2–3 in., ovate-lanceolate, acuminate, sinuate or crenate, young pubescent, mature nearly glabrous; petiolules of the upper tertiary leaflets hardly any. *Peduncles* 1–3 in.; panicles 10 by 6 in.; bracts inconspicuous. *Calyx* $\frac{1}{12}$ in. *Corolla-tube* 2–3 by $\frac{1}{16}$ in.; mouth 1 in. diam. *Stamens* shortly exsert, glabrous; anthers white. *Disc* small, cushion-like; stigma exsert, of 2 small ovate plates. *Capsule* 12 by ¾ in., acute at both ends; valves woody; septum ultimately free, simple, flat; seeds including the wing 1 by ½ in.; wing narrow at the apex, 0 at the base; seeds attached on opposite margins of the septum much overlapping.

III. OROXYLUM, *Vent.*

A glabrous tree. *Leaves* opposite, large, 2–3-pinnate; leaflets ovate, entire. *Raceme* terminal, long. *Calyx* large, leathery, campanulate, truncate or obscurely toothed. *Corolla* large, campanulate-ventricose, white or purplish; lobes 5, subequal, round, crisped, toothed. *Stamens* 5; anthers glabrous, 2-celled; cells parallel, oblong. *Capsule* large, linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid; wing hyaline, broad.

X **O. indicum,** *Vent. Dec. Gen. Nov.* 8; *Kurz For. Fl.* ii. 237. Bignonia indica, *Linn. Sp. Pl.* 871; *Lamk. Dict.* i. 423; *Roxb. Fl. Ind.* iii. 110; *Wall. Cat.* 6514; *Bedd. For. Man.* 148. B. pentandra, *Lour. Fl. Cochinch.* 379. Spathodea indica, *Pers. Syn.* ii. 173. Calosanthes indica, *Blume Bijd.* 760; *DC. Prodr.* ix. 177; *Wight Ic.* t. 1337; *Dalz. & Gibs. Bomb. Fl.* 161; *Bureau Monogr. Bign.* t. 9; *Brand. For. Fl.* 347.—*Rheede Hort. Mal.* i. t. 43.

Throughout INDIA, alt. 0–3000 ft., from the Himalaya to Ceylon and Malacca, common; not in the western drier area, but in the Terai west to the Chenab (*Brandis*).—DISTRIB. Malaya, Cochin China, Ava.

Attains 25–40 ft. (Roxburgh says "one of the tallest trees on the Coromandel coast," concerning which there must be some mistake); bark thick. *Leaves* 2–4 ft. diam., ternately bipinnate; leaflets 5 by 3–4 in., acuminate; petiolule short. *Peduncle* 1 foot, thick; raceme 10 in.; pedicels ¼–1 in. *Calyx* 1 by ¾ in., fleshy. *Corolla* 2½ in., fleshy; mouth 2–3½ in. diam. *Stamens* shortly exsert; base of filaments woolly; fifth filament rather shorter than the other 4; anther-cells divergent below; connective with a short mucro. *Disc* large, fleshy. *Style* 2½ in.; stigma ⅛ in. wide, of 2 semicircular plates. *Capsule* 1–3 ft. by 2–3¼ in., hardly ⅓ in. thick, margins somewhat incurved; valves woody; septum flat. *Seeds* including the wing attaining 3 by 1⅝ in. (usually smaller), winged all round except at the base; those attached on opposite margins of the septum scarcely overlapping.

IV. TECOMA, *Juss.*

Shrubs or small trees, erect or scandent. *Leaves* usually opposite, in the 1 Indian species simple, in others compound. *Racemes* or panicles terminal. *Calyx* tubular-campanulate, subequally 5-toothed. *Corolla* tubular-ventricose, orange or red; lobes 5, round, subequal. *Capsule* linear or narrow, loculicidally 2-valved, somewhat compressed at right angles to the septum. *Seeds* thinly discoid; wing hyaline, broad.—Species 24, in the tropics of the whole world, mostly American.

T. undulata, *G. Don Gen. Syst.* iv. 223; leaves narrowly oblong entire undulate. *DC. Prodr.* ix. 222; *Dalz. & Gibs. Bomb. Fl.* 161; *Brand. For. Fl.* 352; *Boiss. Fl. Orient.* iv. 80. T.? glauca, *DC. l. c.* 223. Bignonia undulata, *Smith Exot. Bot.* i. 35, t. 19; *Roxb. Fl. Ind.* iii. 101; *Wall. Cat.* 6498. B. glauca, *Dcne. in Jacquem. Voy. Bot.* 137, t. 142. Tecomella undulata, *Seem. in Seem. Journ. Bot.* i. 18.

WESTERN INDIA, alt. 0–3000 ft.; Scinde, Punjab, Guzerat, Rajputana, extending eastwards to the Jumna.—DISTRIB. Beloochistan, Arabia.

A shrub or small tree; innovations stellately grey-puberulous, otherwise glabrate. *Leaves* 6 by 1½ in., obtuse; petiole ¾ in. *Corymbs* few-fld., mostly on shortened lateral branches; pedicels ¼–½ in. *Calyx* ⅓ in.; lobes hardly ⅛ in., broad, obtuse. *Corolla* 1½ in., orange. *Stamens* scarcely exsert, glabrous; anther-cells distinct, pendulous, narrowly oblong. *Disc* cup-shaped. *Stigma* spathulate, sub-2-lobed. *Capsule* 8 by ⅓ in., slightly curved; valves tough, thin. *Seeds* (including the wing) 1 by ⅓ in., wing very narrow round the apex of the seed, 0 at its base.

V. DOLICHANDRONE, *Seem.*

Trees, glabrous or tomentose. *Leaves* opposite, 1-pinnate. *Racemes* or panicles terminal. *Calyx* in æstivation closed, at flower-time cleft to the base on one side, spathaceous. *Corolla-tube* long or short; lobes 5, subequal, round, crisped crenate or incised. *Capsule* elongate, terete or somewhat compressed, loculicidally 2-valved, sub-4-celled. *Seeds* thinly discoid, on

each side broadly winged.—Species 12, in the hotter parts of Africa, Asia and Australia.

1. **D. stipulata,** *Benth. in Gen. Pl.* ii. 1046; leaflets elliptic caudate-acuminate, calyx densely woolly or floccose, corolla yellow-brown, narrow part of its tube 1 in., wings of the seed membranous. Bignonia stipulata, *Roxb. Fl. Ind.* iii. 108. Spathodea stipulata, *Wall. Cat.* 6518, letters A, D, *and part* C, and *Pl. As. Rar.* iii. 20, t. 238; *DC. Prodr.* ix. 205; *Kurz For. Fl.* ii. 234. Markhamia stipulata, *Seem. in Seem. Journ. Bot.* i. 226.

PEGU; Rangoon, *M'Lelland*; extending thence north to Ava (*Kurz*).

A tree, 30–40 ft.; branchlets and inflorescence with yellow or brown, easily separable, wool. *Leaves* 1–1½ foot; leaflets 3–5 pairs, 6 by 3 in., entire or distinctly serrulate, mature nearly glabrate or with yellow or brown wool adherent; stipules 0, but rudimentary leaves ½–1 in. diam. are often developed in the axils. *Raceme* short, stout, 4–10-fld.; pedicels ¼–1 in. *Calyx* ¾–1¾ in., leathery, densely hirsutely woolly or deciduously fleecy. *Corolla* 2–3 in., narrow portion of the tube constricted at the top, then suddenly dilated into a campanulate portion 1 in. long; lobes ¾ in., crisped-crenate. *Anther-cells* large, elliptic, separate, pendulous, attached below their tips. *Capsule* 18–24 by 1 in., thickly tomentose floccose. *Seeds* 1¾ by ⅜ in. (including the wings).

VAR. *velutina*; leaves serrulate, calyx tawny velvety. Spathodea velutina, *Kurz in Journ. As. Soc.* 1873, pt. 2, p. 90, and *For. Fl.* ii. 235.—Pegu; *Kurz.*—Not seen; Kurz says it only differs from *D. stipulata* in having the leaves serrulate (not entire), the calyx tawny velvety (instead of tawny villous); which characters can be seen in several standard examples of *D. stipulata.*

2. **D. Rheedii,** *Seem. in Seem. Journ. Bot.* viii. 380; glabrous or minutely puberulous, leaflets elliptic much acuminate, corolla white, narrow portion of its tube 3–5 in., wings of the seed corky. Bignonia spathacea, *Linn. f. Suppl.* 283. B. longissima, *Lour. Fl. Cochinch.* 380? Spathodea longiflora, *Vent. Choix.* n. 40, *in obs.* S. Rheedii, *Wall. Cat.* 6516; *DC. Prodr.* ix. 206; *Wight Ic.* t. 1339; *Bedd. For. Man.* 168; *Kurz For. Fl.* ii. 234. S.? Loureiriana, *DC. l. c.* 209? S. Diepenhorsti, *Miq. Fl. Ind. Bat.* ii. 754.—*Rheede Hort. Mal.* vi. t. 29.

MALABAR, *Wight*; common in the plains, *Beddome.* MALAY PENINSULA from Prome to Malacca, common; *Wallich, Griffith,* &c. ANDAMANS; *Kurz.* CEYLON; *Thwaites.*—DISTRIB. Malay Archipelago.

A tree, attaining 50–60 ft. *Leaves* a foot long; leaflets 3–4 pairs with an odd one, 2–3 in., rhomboid, often unequal at the base; petiolule ¼ in. *Corymbs* few- (sometimes 1-) fld., short-peduncled; pedicels ¼–1 in., stout. *Calyx* 1½ in. *Corolla* 4–7 in., white; tube campanulate near the mouth; segments 1 in., crenate-toothed. *Anther-cells* large, elliptic, separate, divaricate. *Capsule* 18 by ¾–1 in., nearly straight, not ribbed. *Seeds* (including the wings) ¾ by ¼ in., rectangular.

3. **D. crispa,** *Seem. in Seem. Journ. Bot.* viii. 381, *excl. some syn.*; glabrous or innovations puberulous, leaflets 5–7 shortly acuminate petioluled, corolla white tube 1–2 in. cylindric, pod slightly compressed. Bignonia crispa, *Ham. in Roxb. Fl. Ind.* iii. 103. Spathodea crispa, *Wall. Cat.* 6515; *DC. Prodr.* 9, p. 206; *Brand. For. Fl.* 350; *Bedd. For. Man.* 168.

S. DECCAN PENINSULA; Coimbatore, Paulghat, *Wight,* &c.

A tree, 40–60 ft. *Leaves* 8–12 in.; leaflets 2–4 in., broadly elliptic; petiolule 0–½ in. *Corymbs* short-peduncled 1–7-fld.; pedicels ⅓–1½ in. *Calyx* ¾–1 in., rusty puberulous when young, soon glabrate. *Corolla-tube* ⅛–⅙ in. diam.; mouth 2 in. diam.; lobes rounded, crisped-crenate. *Anther-cells* oblong, separate, divaricate.

Capsule 12 by $\frac{5}{8}$ in., valves woody, speckled, smooth. *Seeds* $1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., subrectangular, wings membranous.—The Calcutta Botanic Garden specimen in Herb. Wallich has the mature leaves, petioles and corymbs softly ashy pilose. As to the synonyms of older authors adduced by Seemann, several are described as hirsute plants; while *Bignonia spathacea,* Linn. f., is founded on *Rheede Hort. Mal.* vi. t. 29, which Seemann himself refers to *D. Rheedii.*

4. **D. falcata,** *Seem. in Seem. Journ. Bot.* viii. 381; grey pubescent or shortly villous, leaflets 5–7 mostly obtuse, corolla white tube 1–$1\frac{1}{4}$ in. slender below, pod much compressed. Bignonia spathacea, *Roxb. Cor. Pl.* ii. 24, t. 144 (*excl. capsule*), and *Fl. Ind.* iii. 103. B. atrovirens, *Roth Nov. Sp.* 284. Spathodea falcata, *Wall. Cat.* 6517; *DC. Prodr.* ix. 206; *Dalz. & Gibs. Bomb. Fl.* 160; *Bedd. Fl. Sylv.* t. 71; *Brand. For. Fl.* 350, *partly.* S. atrovirens, *Spreng. Syst.* ii. 835.

DECCAN PENINSULA; Mysore and Vellyengry Hills, *Wight*; Belgaum, *Ritchie,* &c.

A tree, 20–50 ft. *Leaves* 3–6 in.; leaflets $\frac{1}{2}$–$1\frac{1}{2}$ in., obovate or round elliptic, rarely with a small obtuse point; petiolule 0, rarely $\frac{1}{8}$–$\frac{1}{5}$ in. *Corymbs* few- (mostly 3–1-) fld., subsessile; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$–$\frac{5}{8}$ in., of the expanded flowers softly grey-pubescent. *Corolla* nearly as of *D. crispa,* but the tube hardly $\frac{1}{10}$ in. diam. downwards. *Anthers* included, cells nearly parallel, differing much from those of *D. crispa*; this may be a sexual character, but is so in all the examples, as in the figure of Beddome. *Capsule* (and seeds) nearly as in *D. crispa,* but more compressed and usually more curved.

5. **D. Lawii,** *Seem. in Seem. Journ. Bot.* viii. 380; glabrous or innovations minutely puberulous, leaflets 5–7 subsessile, corolla white tube 1–$1\frac{1}{2}$ in. slender, pod compressed. D. serrulata, *Seem. l. c.* 383 (*as to the Central Indian tree*). Spathodea falcata, *Brand. For. Fl.* 350. S. crispa, *Bureau Monogr. Bign.* t. 27.

BOMBAY and CONCAN; *Law.* CENTRAL PROVINCES; *Edgeworth, Dr. Stewart, R. Thompson.* RAJPUTANA; Meywar, *Dr. Brandis.*

Considered by Dr. Brandis as a glabrous var. of *D. falcata.* The leaflets are sessile, often larger than those of *D. falcata,* and (mostly) very shortly acuminate. The one capsule seen is very nearly straight. The Central Indian example of Edgeworth, referred by Seemann to the Burmese *Stereospermum serrulatum,* has (as not rarely in *D. falcata* and *D. Lawii*) a few obscure teeth to the leaflets.

6. **D. arcuata,** *Clarke*; pubescent or subfloccose, leaflets 9–11 roundish elliptic, corolla white tube $1\frac{1}{2}$–$2\frac{1}{2}$ in. narrowly cylindric. Spathodea arcuata, *Wight Ic.* t. 1340; *Bedd. For. Man.* 169. S. crispa, *Dalz. & Gibs. Bomb. Fl.* 160.

S. MADRAS; Coimbatore and Ootacamund, *Wight, Beddome.*

Leaves 6–12 in.; leaflets 2–3 in., obtuse at both ends, sometimes with a short mucro, floccose-pubescent on both surfaces; petiolule 0–$\frac{1}{6}$ in. *Calyx* 1 in., floccose-pubescent. *Corolla* 3 in., mouth 2 in. diam., lobes crisped crenate. *Anthers* included, cells nearly parallel. *Capsule* not seen.—United with *D. crispa* by Seemann and Dalzell.

VI. HETEROPHRAGMA, *DC.*

Trees. *Leaves* large, 1-pinnate. *Flowers* large; panicles terminal, woolly. *Calyx* ovoid, closed when young, irregularly 3–5-lobed during flower. *Corolla* tubular-ventricose, glabrous or densely tomentose without, rose or yellow; lobes 5, rounded, subequal. *Capsule* elongate, cylindric or compressed, falcate or twisted, loculicidally 2-valved; septum flat or 4-angu-

lar. *Seeds* compressed with a membranous wing on each side.—Species 5, 3 Indian, 2 African.

1. **H. sulfureum,** *Kurz in Journ. As. Soc.* 1873, pt. ii. p. 90, and *For. Fl.* ii. 234; leaflets elliptic crenulate mature nearly glabrous, corolla yellow, tube $1\frac{2}{3}$ in., capsule straight linear much compressed densely woolly.

PEGU; Prome and Pegu Yomah, *Kurz.*

A tree, 25–40 ft. *Leaves* 2–3 ft.; leaflets 9–11, 6 by 3 in.; petiolule $\frac{1}{10}$ in. *Panicles* short, densely tomentose, appearing before the leaves; pedicels $\frac{1}{3}$ in., tomentose. *Calyx* $\frac{3}{4}$ in., 2–3-lobed to the middle, woolly without. *Corolla* floccose without, afterwards nearly glabrate; mouth 2 in. diam.; lobes crisped. *Capsules* 18–24 by $1–1\frac{1}{4}$ in. *Seeds* $1\frac{1}{2}$ by $\frac{1}{2}$ in.—Kurz remarks that the capsules are exactly as those of *Dolichandrone stipulata,* which is the case with the (unattached) capsules transmitted. The leaves are also very like those of *Dolichandrone stipulata,* but the flowers are considerably smaller. The tree is referred by Kurz to *Heterophragma,* because the calyx is irregularly lobed, not spathaceous; but in one example of Kurz the calyx is split to the base on one side, and the tree appears a *Dolichandrone.*

2. **H. Roxburghii,** *DC. Prodr.* ix. 210; leaflets elliptic entire or crenate mature nearly glabrous, corolla rose, tube $1\frac{1}{2}$ in., capsule straight narrowly oblong slightly compressed smooth. *Dalz. & Gibs. Bomb. Fl.* 160; *Bedd. For. Fl.* 169. Bignonia quadrilocularis, *Roxb. Cor. Pl.* ii. 24, t. 145, and *Fl. Ind.* iii. 107; *Wall. Cat.* 6507. Spathodea Roxburghii, *Spreng. Syst.* ii. 835; *Brand. For. Fl.* 350.

W. DECCAN PENINSULA; from Bombay southwards, *Wight, Ritchie,* &c. CENTRAL INDIA; Godavery Forests, fide *Brandis.*

A large tree; innovations woolly. *Leaves* 1–2 ft.; leaflets 7–9, $4\frac{1}{2}$ by 2 in., obtuse with a short point; petiolule $0–\frac{1}{6}$ in. *Corymbs* compound, dense, many-fld.; pedicels short, stout, woolly. *Calyx* $\frac{1}{2}–\frac{3}{4}$ in., irregularly lobed half-way down, or on one side more deeply or obscurely 2-lipped. *Corolla* floccose, ultimately glabrate, mouth 2 in. diam., lobes crisped. *Anther-cells* elliptic, divaricate at base. *Capsule* 8–12 by $1\frac{1}{2}–2$ in., divided into 4 cells by the 4-ridged septum. *Seeds* $1\frac{1}{2}$ by $\frac{3}{4}–1$ in.

3. **H. adenophyllum,** *Seem.*; *Benth. in Gen. Pl.* ii. 1047; leaflets large broadly elliptic mature pubescent, corolla brown-yellow densely tomentose, tube $1\frac{1}{2}$ in., capsule long linear cylindric ribbed twisted. *Kurz For. Fl.* ii. 236. Bignonia adenophylla, *Wall. Cat.* 6502. Spathodea adenophylla, *A. DC. Prodr.* ix. 206; *Wight Ill.* t. 160.

From ASSAM and E. BENGAL to TENASSERIM and the ANDAMANS; frequent.—DISTRIB. Ava.

A tree, 30–50 ft.; innovations tomentose. *Leaves* $1–1\frac{1}{2}$ foot; leaflets 5–7, 7 by 5 in. (or in some examples 12–14 in. long), acute or obtuse, subsessile. *Panicle* 8–10 in. diam., stout, many-fld.; bracts $\frac{1}{2}$ in., narrowly lanceolate, deciduous. *Calyx* $\frac{3}{4}$-1 in., rusty tomentose, irregularly 5-lobed half-way down. *Corolla* when expanded densely woolly-tomentose without, mouth 2 in. diam., lobes hardly crisped or crenate. *Anther-cells* nearly separate, pendulous. *Capsule* 1–3 ft. by 1 in. diam., cylindric, cork-screw-like; septum flat. *Seeds* $1\frac{1}{2}$ by $\frac{1}{3}–\frac{1}{2}$ in.

VII. MAYODENDRON, *Kurz.*

A glabrous tree. *Leaves* ternately decompound. *Racemes* small, terminal on short lateral shoots. *Calyx* spathaceous, split on one side half-way down. *Corolla* tubular, almost narrowed at the mouth; lobes very short, subequal. *Stamens* 4, scarcely didynamous, rudiment of the fifth present; anther-cells almost parallel. *Capsule* linear cylindric slender, sub-4-celled, loculicidally 2-valved, valves thin. *Seeds* flat, winged on the sides.

M. igneum, *Kurz Preliminary Pegu For. Rep. App.* D, *with a fig.*, and *For. Fl.* ii. 233. Spathodea ignea, *Kurz in Journ. As. Soc.* 1871, pt. ii. p. 77.

MARTABAN up to 3000 ft., not infrequent; *Kurz.*—DISTRIB. Ava, Yunan.

A tree, 30–40 ft.; innovations minutely puberulous. *Leaves* ample, lower pinnæ 2-pinnate; leaflets 3–4 in., elliptic, acuminate. *Racemes* 5-fld., pedicels $\frac{1}{2}$ in. *Calyx* $\frac{2}{3}$ in., puberulous. *Corolla* $2\frac{3}{4}$ by $1\frac{1}{2}$ in., orange crimson; narrow cylindric portion of the tube much shorter than the funnel-shaped part; lobes $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Capsule* 18 by $\frac{1}{3}$ in., subterete, glabrous. *Seeds* including the pellucid wings, narrow-linear, $\frac{1}{3}$ in. long.

VIII. STEREOSPERMUM, *Cham.*

Trees. *Leaves* 1- or 2-pinnate. *Panicles* large, lax, terminal. *Calyx* ovoid, open or closed in the bud, during flower truncate or shortly unequally lobed. *Corolla* tubular-ventricose, yellow or pale rose; lobes 5, nearly equal, round, crisped toothed or laciniate. *Capsule* elongate, terete, subcompressed or obscurely quadrangular, loculicidally 2-valved; septum thickened, subterete. *Seeds* in 1 or 2 series, compressed or subtrigonous, with a membranous wing on each side.—Species 10, in tropical Asia and Africa.

Sect. 1. **Eustereospermum.** *Leaves* 1-pinnate.

1. **S. chelonoides,** *DC. Prodr.* ix. 210; leaflets elliptic caudate-acuminate glabrous, panicle-branches slender glabrous, corolla $\frac{3}{4}$ in., capsule linear obscurely quadrangular, seeds subtrigonous embedded in notches in the septum. *Wight Ic.* t. 1341; *Bedd. Fl. Sylv.* t. 72; *Brand. For. Fl.* 352; *Kurz For. Fl.* ii. 230. Bignonia chelonoides, *Linn. f. Suppl.* 282; *Roxb. Fl. Ind.* iii. 106; *Wall. Cat.* 6501. B. caudata, *Miq. in Pl. Hohenack.* n. 182, *not of DC.* Heterophragma chelonoides, *Dalz. & Gibs. Bomb. Fl.* 160.—*Rheede Hort. Mal.* vi. t. 25.

Through moister INDIA; from the Terai of Oudh and Assam to Ceylon and Pegu. —DISTRIB. Ava.

A tree, 30–60 ft., nearly glabrous except the flowers. *Leaves* 12–18 in.; leaflets 7–11, 5 by 2 in.; petiolule $\frac{1}{3}$–$\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ in., shortly 3–5-toothed. *Corolla* thinly villous within and without; tube rose, lobes yellow or pale flesh-colour, crisped. *Capsule* 12–20 by $\frac{1}{3}$–$\frac{1}{2}$ in., smooth or speckled. *Seeds* 1 by $\frac{1}{3}$ in., easily splitting through the centre.

2. **S. neuranthum,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 91, and *For. Fl.* ii. 230; leaflets oblong or ovate shortly acuminate hairy beneath, panicle short corymb-like viscous-hairy, corolla $1\frac{1}{4}$ in., capsule linear slender subterete keeled, seeds subtrigonous embedded in notches in the septum.

PEGU and MOULMEIN; *M'Lelland, Parish, Kurz.*

A tree, 40–60 ft.; innovations softly villous or subtomentose. *Leaves* 1–$1\frac{1}{2}$ foot; leaflets 5–7, 5 by $2\frac{1}{2}$ in.; petiolule $\frac{1}{6}$ in. *Panicle* loose, about 12-fld. *Calyx* $\frac{1}{3}$ in., hairy; lobes 3–5, very short, broad. *Corolla* very pale lilac or blueish white (Kurz), sparsely pilose; lobes rounded, crisped crenate hardly toothed. *Capsule* 12 by $\frac{1}{3}$-$\frac{1}{2}$ in., less woody than that of *S. chelonoides*; valves 1-ribbed on the back;, seeds and septum as in *S. chelonoides.*

3. **S. suaveolens,** *DC. Prodr.* ix. 211; leaflets broadly elliptic acuminate or acute entire or serrulate young hairy, panicle very compound many-fld. viscous hairy, corolla 1–$1\frac{1}{4}$ in., capsule linear terete woody, seeds subtrigonous embedded in notches of the septum. *Wight Ic.* t. 1342; *Bedd. For. Man.* 169; *Brand. For. Fl.* 351; *Kurz For. Fl.* ii. 231. Bignonia suaveo-

lens, *Roxb. Fl. Ind.* iii. 104; *Wall. Cat.* 6499. Tecoma suaveolens, *G. Don Gen. Syst.* iv. 244. Heterophragma suaveolens, *Dalz. & Gibs. Bomb. Fl.* 161.

Throughout moister INDIA from the Himalayan Terai to Travancore and Tenasserim. CEYLON (Thwaites thinks only planted in).

A tree, 30–60 ft.; innovations viscous-hairy. *Leaves* 12–18 in.; leaflets 7–9, 5½ by 3 in.; petiolule hardly $\frac{1}{10}$ in. *Calyx* ⅓ in., hairy; lobes 3–5, very short, broad. *Corolla* pale or dark purple, puberulous without, hairy in the throat; lobes rounded, crisped-crenate. *Capsule* 18 by ⅜ in., slightly rough with tubercles, obscurely 4-ribbed, glabrous. *Seeds* 1¼ by ¼ in., deeply notched at the middle.

4. **S. fimbriatum,** *DC. Prodr.* ix. 211; leaflets oblong caudate-acuminate subentire young hairy, panicle very compound viscous hairy, corolla 2 in. lobes fimbriate into laciniæ ¼ in. long. *Kurz For. Fl.* ii. 231. Bignonia fimbriata, *Wall. Cat.* 6500.

MALAY PENINSULA; Moulmein, *Wallich*; Tenasserim, *Griffith*; Karen country up to 3000 ft., *Kurz*; Malacca, *Maingay*.

Attaining 80 ft., *Kurz*. *Leaves* 1–2 ft.; leaflets 7–9, 6 by 2 in.; petiolule ⅛ in. *Corolla* pale-lilac. *Capsule* 12 by ⅓ in.; valves somewhat woody, smooth, slightly keeled.—Exceedingly like *S. suaveolens*, except as to the fimbriate corolla; the leaflets are usually narrower.

5. **S. glandulosum,** *Miq. Fl. Ind. Bat. Suppl.* 565; glabrous or the innovations puberulous, leaflets large elliptic acute or acuminate entire, panicles subracemose, calyx campanulate subtruncate, corolla 1½ in., capsule narrowly linear slender smooth. Spathodea glandulosa, *Blume Bijd.* 762; *DC. Prodr.* ix. 207. Bignonia Porteriana, *Wall. Cat.* 6509; *DC. l. c.* 165. Lagarophyxis glandulosa, *Miq. in Ann. Mus. Lugd.* i. 199. Radermachera stricta, *Zoll.*; *Bureau Monogr. Bign.* t. 28.

PENANG; *Wallich*. MOULMEIN; *Lobb*. MALACCA; *Maingay*.—DISTRIB. Malay Archipelago.

Leaflets 3–7, 7 by 3 in.; petiolule ¾ in. *Panicles* 1 foot long; branches short, 1–2-fid. *Calyx* ½ in., glabrate, in fruit often urceolate. *Corolla* glabrous; narrow cylindric portion of the tube shorter than the campanulate part; lobes ⅓ in. diam., round, subentire, not crisped. *Capsule* 9 by ⅓ in.; valves thin, tough. *Seeds* (including the wings) ¾ by ⅛ in., thinly discoid.

6. **S.? Wallichii,** *Clarke*; leaflets large rhomboid acuminate subentire mature pubescent, pod linear very long compressed smooth. Spathodea stipulata, *Wall. Cat.* 6518 B *and part* C.

IRRAWADDY ESTUARY; *Wallich*.

Leaflets 7, 8 by 4 in., cuneate at the base, subsessile. *Corolla* not seen. *Capsule* 45 by ⅝ in.; septum spongy, ½ by ¼ in. *Seeds* sub-4-seriate, 1½ by ⅓ in., subrectangular, compressed flat, wings membranous.—This imperfectly known tree evidently differs from all the other species, and is marked by D. Don (in Herb. Wallich) as *Spathodea Wallichii*, D. Don: the septum appears too spongy for *Dolichandrone*. Seemann has merely noted that the seeds are biserial (i.e. in each cell) without making any guess at the genus.

Sect. 2. **Xylocarpæa.** Leaves 2-pinnate.

7. **S. xylocarpum,** *Wight Ic.* t. 1335–6; leaflets elliptic acute entire mature glabrous, panicles compound dense pubescent, corolla 1¾–2 in. white tinged yellow, capsule stout linear cylindric rugged. Bignonia xylocarpa, *Roxb. Fl. Ind.* iii. 108; *Wall. Cat.* 6511; *DC. Prodr.* ix. 169; *Bedd. Fl.*

Sylv. t. 70; *Dalz. & Gibs. Bomb. Fl.* 159. Tecoma xylocarpa, *G. Don Gen. Syst.* iv. 225. Spathodea xylocarpa, *Brand. For. Fl.* 349, t. 43.

DECCAN PENINSULA; common, extending north to the Satpura Range, *Brandis.*

A tree, 30–60 ft.; innovations pubescent. *Leaves* 1–4 ft.; leaflets 3 by 1½ in., subsessile. *Panicle* somewhat rigid, erect. *Calyx* ½–⅝ in., pubescent or mature glabrate; lobes 3–5, very short, broad. *Corolla* ventricose from near the base, subglabrous; lobes round, crisped. *Filaments* hairy below. *Capsule* 12–30 by 1–1½ in., glabrous, tubercular. *Seeds* (including the wings) 1¼ by ¼ in., thinly discoid.

8. **S. hypostictum,** *Miq. Fl. Ind. Bat. Suppl.* 565; glabrous, leaflets oblong or elliptic acuminate entire, panicles compound branches slender, corolla 2 in., pod linear very slender not woody smooth. Spathodea gigantea, *Blume Bijd.* 761; *DC. Prodr.* ix. 207. S. amœna, *A. DC. Prodr.* ix. 208; *Brand. For. Fl.* 349. S. Lobbii, *Teys. & Binnend. in Nat. Tidsch.* xxv. 413. Bignonia amœna, *Wall. Cat.* 6512, and *Pl. As. Rar.* ii. 78, t. 183. Lagaropyxis gigantea, *Miq. in Ann. Mus. Lugd.* i. 198. Radermachera amœna, *Seem. in Seem. Journ. Bot.* viii. 146; *Kurz For. Fl.* ii. 232. R. gigantea & Lobbii, *Miq. in Ann. Mus. Lugd.* iii. 250.

TAVOY; *Wallich.* MALACCA and SINGAPORE; *Griffith, Maingay.*—DISTRIB. Java, Sumatra.

Attaining 80 ft. *Leaves* 2-pinnate (and ex Kurz 3-pinnate); leaflets 5 by 2 in.; petiolule ½ in. *Calyx* ⅓–½ in., closed in the bud, in flower shortly 2-lipped or subspathaceous. *Corolla* glabrous, white, tube rose; lobes crenulate, hardly crisped. *Capsule* 15 by ⅓ in.; valves thin, tough. *Seeds* (including the wings) ⅞ by ⅛–⅙ in., thinly discoid.

9. **S.? Ghorta,** *Clarke*; glabrous or innovations puberulous, leaflets sessile elliptic acute, partial rachises narrowly winged, corolla 2 in. elongate tubular lobes round subentire. Bignonia Ghorta, *Ham. in Wall. Cat.* 6510; *DC. Prodr.* iv. 167.

"DEVIDUBA;" *Hamilton.*

Leaves opposite, bipinnate; leaflets 2 by ⅝ in., unequal-sided, subsessile, entire. *Peduncle* terminal; panicle many-fld., branches slender; pedicels ¼–⅓ in., subfascicled. *Calyx* ⅓ in., campanulate; lobes 4–5, short, triangular. *Corolla* broadly cylindric, slightly wider upwards, glabrous; mouth hardly 1 in. diam. *Stamens* 4, didynamous; anther-cells narrowly oblong, separate, divaricate. *Capsule* not seen.

IX. PAJANELIA, *DC.*

A large tree, glabrous except the corolla. *Leaves* large, 1-pinnate; leaflets numerous, entire. *Flowers* large in terminal, thyrsoid panicles. *Calyx* large, ovoid, closed in the bud, in flower ventricose-campanulate, 5-fid. *Corolla* large, tubular-ventricose; lobes 5, crisped. *Capsule* large, narrowly oblong, winged, compressed, loculicidally 2-valved. *Seeds* compressed, with a membranous wing on each side.

P. Rheedii, *DC. Prodr.* ix. 227, *excl. syn. Lour. & Pers.*; *Wight Ic.* tt. 1343–4; *Bureau Monogr. Bign.* t. 20; *Bedd. For. Man.* 169. Bignonia indica var. β, *Linn. Sp. Pl.* 871. B. Pajanelia, *Ham. in Trans. Linn. Soc.* xiii. 316. B. longifolia, *Willd. Sp. Pl.* iii. 306. B. multijuga, *Wall. Cat.* 6503, and *Pl. As. Rar.* i. 81, tt. 95, 96. Payanelia multijuga, *Kurz For. Fl.* ii. 227.

SILHET and KHASIA HILLS; *Wallich, Griffith.* PEGU, TENASSERIM, and ANDAMANS; *Kurz.* MALABAR, common up to 2000 ft., *Beddome*, &c.

A tree, 30–60 ft. *Leaves* 1½–3 ft.; leaflets 19–25, 3–8 in., elliptic, acuminate,

unequal at the base; petiolule 1/8 in. *Panicles* 12–18 in. *Calyx* 3/4–1 in.; lobes irregular, extending about half-way down. *Corolla* 2½ in.; lobes 1 in., hairy especially on the margins, dilated and rounded at the tips. *Capsule* 12–20 by 2½–3½ in., glabrous; wing on each margin split, so that the capsule appears 4-winged; septum flat, but with a ridge on each face. *Seeds* 3/4 by 1/8 in.

X. DIPLANTHERA, *R. Br.*

Trees, tomentose or villous. *Leaves* undivided, large, opposite or whorled. *Panicles* terminal, sessile, dense, globose. *Calyx* campanulate, closed in the bud, in flower shortly 2–5-lobed. *Corolla* yellow, tubular-ventricose; lobes round, entire, subequal. *Stamens* 4, didynamous; anther-cells lanceolate, separate, pendulous. *Capsule* broadly spindle-shaped, woody, loculicidally 2-valved; septum flat, thick. *Seeds* compressed, discoid, with a hyaline wing.—Species 6, extending from Malacca to N. Australia and New Caledonia.

D. bancana, *Scheffer in Nat. Tidschr.* xxxi. 334.

MALACCA; *Walker, Maingay.*—DISTRIB. Bangka.

A lofty tree. *Leaves* 8–13 by 5–8 in., round-ovate, subentire, pubescent, tawny villous on the nerves beneath, 1–2 large glands above near the apex of the petiole; petiole 4 in. *Panicles* 4–5 in. diam., tawny-villous. *Calyx* 5/8 in., puberulous, articulated on the pedicel. *Corolla* 1 in. *Stamens* and style ultimately long exsert. *Capsule* 6 by 1¼ in., smooth. *Seeds* 1½ by 3/4 in., wing continued all round except the base.

XI. AMPHICOME, *Lindl.*

Herbs; rootstock woody. *Leaves* alternate, 1-pinnate; leaflets toothed. *Racemes* terminal; bracts small, linear, persistent. *Calyx* campanulate, truncate or 5-toothed. *Corolla* red, tube elongate widened upwards; lobes 5, round, entire, nearly equal. *Stamens* 4, didynamous, included; anthers glabrous or hairy, cells separate, divaricate, with a tooth-like appendage near the base. *Ovary* subsessile; ovules sub-2-seriate. *Capsule* linear, slender, terete, smooth, loculicidally splitting on one side, subfollicular; septum thin. *Seeds* in one row on each margin of the septum, narrowly oblong, tuberculate, the hyaline wing on each side more or less laciniate.—Species 2, in North-west India and Cabul.

1. **A. arguta,** *Lindl. Bot. Reg.* 1838, t. 19; glabrous, leaflets lanceolate, calyx-teeth very acute, corolla attaining 1½ by ½ in. *DC. Prodr.* ix. 237; *Bureau Monogr. Bign.* t. 24. Incarvillea arguta, *Royle Ill.* 296. I. diffusa, *Royle Ill.* t. 72, fig. 1 (*corolla shown too small*). I. emodi, *Wall. Cat.* 487, *first example.*

N.W. HIMALAYA, *Blinkworth, Royle*; Kumaon, alt. 7000 ft., *Strachey & Winterbottom*; Simla, *Fielding*; Kunawur and Wangtu, *T. Thomson, Stoliczka.*

Stems 20 in., sometimes divided. *Leaves* 5 in.; leaflets 5–9, 1–1½ in.; petiolules 1/12 in. *Racemes* 6–8 in.; pedicels 1 in. *Calyx* ⅓ in., teeth caudate-acuminate from a triangular base. *Corolla* glabrous; cylindric base of the tube ⅓ in., campanulate portion of the tube 3/4 in. *Capsule* 6–8 by 1/8–1/6 in.; valves thin. *Seeds* (including the wings) ½ by 1/12 in.

2. **A. emodi,** *Lindl. Bot. Reg.* 1838, t. 19, *in note*; leaflets elliptic or oblong scarcely acute, calyx truncate or with triangular scarcely acuminate teeth, corolla attaining 2 by 3/4 in. *DC. Prodr.* ix. 237; *Bot. Mag.* t. 4890. Incarvillea emodi, *Wall. Cat.* 487, *second example*; *Royle Ill.* 296, *in note.*

W. HIMALAYA, alt. 2–9000 ft., from Kashmir to Nepal; *Wallich, Blinkworth,* &c.—DISTRIB. Cabul?

Glabrous. *Racemes* not rarely 2–3, subpanicled. *Flowers* often not larger than those of *A. arguta.*—This species is very near *A. arguta*: the Affghanistan examples referred to *A. emodi* are all hairy.

ORDER CVIII. **PEDALINEÆ.** (By C. B. Clarke.)

Herbs or undershrubs. *Leaves* opposite, or the upper alternate, entire toothed or divided. *Flowers* irregular, (in the Old-World species) axillary, solitary or rarely clustered; pedicels short; bracts 0 or very small. *Calyx* deeply 4–5-lobed. *Corolla* tubular-ventricose; limb obscurely 2-lipped; lobes 5, imbricate. *Stamens* 4, didynamous; rarely 2. *Ovary* 2- (sometimes 1-) celled; style filiform, stigma shortly 2-lobed; ovules few or many, superposed. *Capsule* 2- or 3–4-celled, indehiscent or dehiscent. *Seeds* (in the Indian species) wingless, exalbuminous.—Species 40, in the warmer parts of both hemispheres.

The Indian species are readily distinguished from *Bignoniaceæ* by their herbaceous habit and wingless seeds, and from most *Scrophularineæ* by their few or 1-seriate seeds.

Martynia diandra, Glox. (DC. Prodr. ix. 253), an American weed (called Tiger-claw or Devil's-claw), is now common in the Gangetic Plain and elsewhere in India; it is a rank coarse herb with capsules beaked by strong curved spines.

Capsule spinous, indehiscent. Seeds 2–1 in each cell . . . . . 1. PEDALIUM.
Capsule spineless, 2–4-valved. Seeds many in each cell . . . . 2. SESAMUM.

I. **PEDALIUM,** *Linn.*

A glabrous annual. *Leaves* opposite or alternate, petioled, ovate, incised. *Pedicels* axillary, solitary, short, 2-glandular at the base. *Calyx* small, 5-partite. *Corolla* yellow; lobes round, patent. *Stamens* 4, didynamous, included; anther-cells ovate, parallel, separate, pendulous. *Ovary* 2-celled; ovules 2 in each cell. *Capsule* hard, indehiscent, upper portion pyramidal-ovoid with 4 patent spines from its base. *Seeds* 2–1 in each cell, pendulous, oblong, testa black.

P. Murex, *Linn.*; *DC. Prodr.* ix. 256; *Burm. Fl. Ind.* 139, t. 45, fig. 2; *Gaertn. Fruct.* i. 276, t. 58; *Lamk. Ill.* t. 538; *Roxb. Fl. Ind.* iii. 114; *Wall. Cat.* 6410; *Wight Ic.* t. 1615; *Dalz. & Gibs. Bomb. Fl.* 162.

DECCAN PENINSULA and CEYLON, frequent.—DISTRIB. Trop. Africa.

A weedy herb, 6–15 in. *Leaves* 2–4 in., irregularly toothed or almost lobed; petiole ½–1½ in. *Pedicels* ⅙ in. *Calyx* ⅙ in.; teeth linear. *Corolla* 1 in., funnel-shaped, glabrous. *Fruit* ⅝ by ⅓ in.

II. **SESAMUM,** *Linn.*

Erect or prostrate herbs. *Leaves* opposite, upper alternate, entire toothed lobed or divided. *Flowers* axillary, solitary, or few and fascicled, short-pedicelled, pale or purplish, sometimes yellow-marked. *Calyx* small, 5-partite. *Corolla* tubular-ventricose, base subgibbous; limb 2-lipped, lobes 5, rounded. *Stamens* 4, didynamous, included; anthers sagittate, cells 2 subparallel. *Ovary* 2-celled, early falsely 4-celled, cells many-ovuled. *Capsule* oblong or ovoid, loculicidally 2-valved, unarmed, in appearance

4-celled. *Seeds* numerous, obliquely oblong.—DISTRIB. Species 10, Indian and tropical or southern Africa.

1. **S. indicum,** *DC. Prodr.* ix. 250; erect, leaves oblong or ovate lower often pedatisect, capsule tetragonous oblong, seeds brown smooth. *Wall. Cat.* 6408; *Wight Ill.* t. 163; *Bot. Mag.* t. 1688; *Dalz. & Gibs. Bomb. Fl.* 161. S. orientale, *Linn.*; *Gaertn. Fruct.* ii. 132, t. 110; *Lamk. Ill.* t. 528; *Roxb. Fl. Ind.* iii. 100. S. luteum, *Retz. Obs.* vi. 31; *DC. l. c.* S. occidentale, *Heer & Regel*; *DC. l. c.*; *Thwaites Enum.* 442.—*Rumph. Herb. Amboin.* t. 76, fig. 1. *Rheede Hort. Mal.* ix. tt. 54, 55.

Throughout the warmer parts of INDIA and CEYLON, cultivated.—DISTRIB. Cultivated in all hot countries. Native country doubtful, probably Asiatic.

Height 1–2 ft., pubescent or puberulous. *Leaves* 3–5 in., variable on the same plant; upper often narrowly oblong subentire, middle ovate toothed, lower lobed or pedatisect; petiole ½–2 in. *Pedicels* ⅛ in., solitary, rarely 2–3-nate. *Sepals* ¼ in., lanceolate. *Corolla* 1¼ in., pubescent, whiteish or with red purplish or yellow marks. *Capsule* 1 by ¼ in., erect, scabrid-pilose, the same width from top to bottom, usually shortly acuminate; 2-valved half-way down, or sometimes to the base, or ultimately 4-valved.

2. **S. laciniatum,** *Klein*; *Willd. Sp. Pl.* iii. 359; prostrate, hispid, leaves ovate lobed and deeply subpedately pinnatifid, capsule ovoid compressed, seeds black reticulate. *DC. Prodr.* ix. 209; *Wight Ic.* t. 1345.

S. DECCAN PENINSULA, *Rottler*, *Wight*, &c.; Cochin, *Johnstone.*

Appressedly prostrate, 1–3 ft., branching. *Leaves* ½–1½ in., orbicular or elliptic in outline, laciniations acute; petiole 0–⅙ in. *Pedicels* ⅙ in., solitary. *Sepals* ⅛ in., lanceolate. *Corolla* 1 in., minutely pubescent, purple, yellow in the palate. *Capsule* ½ by ⅓ in., scabrous-pilose, shortly mucronate; valves 2, dorsally compressed.

3. **S. prostratum,** *Retz. Obs.* iv. 28; prostrate, villous, leaves orbicular or obovate crenate or obtusely lobed with white indumentum beneath, capsule ovoid compressed, seeds black reticulate. *Wall. Cat.* 6409; *Wight Ic.* t. 1346.

MADRAS; especially on sandhills near the sea, *Rottler*, *Wight*, *Shuter.*

Closely allied to *S. laciniatum,* and hardly separable therefrom by the characters given. The leaves are generally entire, sometimes 3-lobed half-way; the teeth never sharp as in *S. laciniatum.*

ORDER CIX. **ACANTHACEÆ.** (By C. B. Clarke.)

Herbs or shrubs, rarely trees. *Leaves* opposite, exstipulate, very rarely divided. *Flowers* rarely solitary, bracteate and 2-bracteolate. *Calyx* 5-partite (in *Thunbergia* small often multifid). *Corolla* 2-lipped, or subequally 5-lobed; lobes imbricated or twisted in bud. *Stamens* 4 or 2, inserted on the corolla-tube; anthers 2- or 1-celled; cells sometimes remote. *Disc* often conspicuous. *Ovary* superior, 2-celled; style filiform, notched or bifid (1 branch often obsolete); ovules one or more in each cell, 1- or 2-seriate, anatropous. *Capsule* loculicidal; valves often elastically recurved, carrying the seeds on the half-septa. *Seeds* (except in *Thunbergia* and the *Nelsonieæ*) hard, seated on upcurved subacute supports (*retinacula*), ovoid or compressed, testa smooth rugose or warted rarely hispid, often clothed with white elastic hairs (best seen when wetted), albumen 0 (except *Nelsonieæ*); radicle next the hilum.—Species 1500, in the tropical and warm temperate regions.

Tribe 1. **Thunbergieæ.** Scandent or twining. *Calyx* minute, annular or 10–15-toothed. *Corolla-lobes* twisted in bud. *Ovules* 2 in each cell, collateral. *Capsule* beaked; retinacula 0 . . . 1. THUNBERGIA.

Tribe 2. **Nelsonieæ.** *Corolla-lobes* imbricate in bud. *Ovules* many, superimposed in two rows in each cell. *Seeds* small, seated on minute papillæ, not on hard retinacula, obscurely albuminous.

Calyx 4-partite. Stamens 2. Bracts rigid, imbricate . 2. ELYTRARIA.
Calyx 4-partite. Stamens 2. Bracts herbaceous . . 3. NELSONIA.
Calyx 5-partite. Stamens 4 . . . . 4. EBERMAIERA.
Calyx 5-partite. Stamens 2, exserted . . . . . . 5. OPHIORRHIZIPHYLLUM.

Tribe 3. **Ruellieæ.** *Corolla-lobes* twisted to the left in bud. *Seeds* on retinacula. *Sepals* 5, or 4 with one larger. *Anthers* usually 2-celled; cells parallel or one a little below the other. *Style* 2-fid, one lobe often suppressed.

Subtribe 1. POLYSPERMEÆ. *Ovules* 3–12 in each cell. *Capsule* normally 6- or more-seeded.

* *Corolla distinctly* 2-*lipped.*

Lower leaves often toothed or pinnatifid. Flowers axillary, sessile. Retinacula scarcely hooked . . . 6. CARDANTHERA.
Leaves entire. Flowers axillary, subsessile. Retinacula hooked . . . . 7. HYGROPHILA.
Cymes elongate. Branches sympodal . . . . . . 8. NOMAPHILA.

** *Corolla subequally* 5-*lobed.*

Bracteoles large. Stamens muticous. Capsule clavate. Base of capsule solid . . . . 10. RUELLIA.
Cymes elongate with sympodal branches. Anther-cells mucronate at base . . . . 11. ECHINACANTHUS.
Flower-clusters separate on the cyme-branches. Connective excurrent at tip. Capsule seed-bearing from the base . . . . 17. ÆCHMANTHERA.
Flowers capitate or axillary, subsessile. Bracteoles small, narrow, or 0. Capsule seed-bearing from the base . . . . 15. HEMIGRAPHIS.
Flowers clustered at the nodes of the almost leafless branches in terminal panicles. Stamens muticous. Capsule seed-bearing from the base . . . . . . 16. STENOSIPHONIUM.

Subtribe 2. TETRASPERMEÆ. *Ovules* 2 in each cell. *Capsule* 4- or fewer-seeded.

* *Placentæ not rising elastically from the base of the capsule* (except in a few *Strobilanthes*).

Corolla subequally 5-lobed. Stamens 4 or 2; anthers muticous . . . . 18. STROBILANTHES.
Corolla large, deeply 2-lipped. Stamens 4; anthers muticous . . . . 19. CALACANTHUS.
Corolla somewhat 2-lipped. Stamens 4; anthers minutely mucronate at base . . . . 9. CALOPHANES.
rolla-tube very long, linear; lobes subequal. Stamens 2 14. DÆDALACANTHUS.

** *Placentæ rising elastically from the base of the ripe capsule.*

Corolla small. Stamens 4. Bracteoles 0 . . . . . . 13. PHAYLOPSIS.
Stamens 4. Bracteoles very large, reticulately nerved . 12. PETALIDIUM.

Tribe 4. **Acantheæ.** *Corolla-tube* short; upper lip obsolete, lower 3-lobed. *Ovules* 2 in each cell. *Retinacula* curved, hardened.

Anterior filaments with an excurrent process . . . . 20. BLEPHARIS.
Anterior filaments without an excurrent process . . . 21. ACANTHUS.

Tribe 5. **Justicieæ.** *Corolla-lobes* imbricate in bud. *Retinacula* curved, hardened. *Anthers* 2–1-celled; cells often spurred at the base, one frequently placed much above the other. *Style* shortly equally 2-fid or subentire.

Subtribe 1. ANDROGRAPHIDEÆ. *Ovules* 3–10 in each cell. *Capsule* normally 6- or more-seeded.

* *Capsule compressed at right angles to the septum; seeds ovoid, hardly compressed.*

Flowers panicled or thyrsoid . . . . 28. ANDROGRAPHIS.
Flowers axillary, clustered, with cladodes (suppressed branchlets) among them . . . . 29. HAPLANTHUS.

** *Capsule subterete, seeds much compressed.*

Corolla-tube very slender, limb small . . . . 30. GYMNOSTACHYUM.
Corolla cylindric, curved, not ventricose nor deeply 2-lipped . . . . 31. PHLOGACANTHUS.
Corolla ventricose, not deeply 2-lipped . . . . . . 32. CYSTACANTHUS.
Corolla deeply 2-lipped . . . . 33. DIOTACANTHUS.

Subtribe 2. BARLERIEÆ. *Ovules* 2–1 in each cell. *Corolla-lobes* 5, subequal. *Stamens* 4, of which 2 are small or obsolete, or 4 1-celled.

Sepals 4, 2 outer opposite larger. Anthers 2-celled . . 22. BARLERIA.
Calyx 2-lipped, 5-lobed. Anthers 2-celled . . . . . 23. NEURACANTHUS.
Outer calyx-lobes much the larger. Anthers 1-celled . 24. CROSSANDRA.

Subtribe 3. ASYSTASIEÆ. *Ovules* 2 in each cell. *Corolla-lobes* 5, subequal. *Sepals* 5, small, subequal. *Stamens* 4 or 2; anther-cells 2, subequal, parallel, muticous.

Corolla-tube long, narrow or subventricose. Stamens 4 25. ASYSTASIA.
Corolla-tube slender. Stamens 2 . . . . 26. ERANTHEMUM.
Corolla-tube ventricose. Stamens 2 . . . . 27. CODONACANTHUS.

Subtribe 4. EUJUSTICIEÆ. *Ovules* 2 in each cell. *Corolla* distinctly 2-lipped.

* *Stamens 4, anthers all subequal 2-celled.*

Calyx deeply 5- or 4-lobed . . . . 34. LEPIDAGATHIS.
Calyx campanulate, 5-toothed . . . . 35. PHIALACANTHUS.

** *Stamens 2, anthers 1-celled.*

Bracts small, narrow. Corolla small . . . . 36. MONOTHECIUM.
Bracts small, narrow. Corolla long . . . . 37. CLINACANTHUS.
Bracts larger than the calyx-segments . . . . 49. HYPŒSTES.

*** *Stamens 2, anthers 2-celled.*

† *Placentæ rising elastically from the base of the capsule.*

Bracts in 1-sided spikes . . . . 46. RUNGIA.
Bracts clustered, shortly peduncled . . . . 47. DICLIPTERA.

† *Placentæ not rising elastically from the base of the capsule.*

¶ *Anther-cells placed one much higher than the other.*

Anther-cells muticous, bracts in opposite pairs, valvate .	48. PERISTROPHE.
Anther-cells minutely spurred at base	38. JUSTICIA.
Anther-cells apiculate, scarcely spurred at base . . .	39. ADHATODA.
Anthers muticous. Flowers clustered. Corolla long .	40. RHINACANTHUS.
Anthers muticous. Flowers thyrsoid. Corolla not large	41. DIANTHERA.

¶¶ *Anther-cells parallel, subequal.*

Bracts small, narrow. Corolla small	42. PTYSIGLOTTIS.
Corolla-tube ovoid, constricted in the throat	43. SPHINCTACANTHUS.
Bracts large, imbricate. Corolla-tube narrow, long . .	44. ECBOLIUM.
Bracts small. Corolla-tube elongate	45. GRAPTOPHYLLUM.

I. **THUNBERGIA,** *Linn. f.*

Scandent. *Leaves* often cordate, hastate or angular. *Flowers* axillary, 1–2-nate, or racemose; bracts at the base of the pedicels leaf-like; bracteoles large, margins coherent at least when young. *Calyx* small, annular, 10–16-toothed, or obscure. *Corolla* conspicuous; tube ventricose, curved; limb oblique; lobes 5, rounded, twisted to the left in bud. *Stamens* 4, didynamous near the base of the corolla-tube; anthers 2-celled, cells parallel, oblique, spurred or not at the base. *Disc* cushion-shaped or annular. *Style* long; stigma funnel-shaped, 2-lobed or subentire, or style 2-fid with capitate stigmas; ovules 2 in each cell, collateral. *Capsule* globose, suddenly narrowed into a barren sword-shaped beak. *Seeds* 2 in each cell, ovoid or dorsally compressed, not hairy, base plane or excavate, funicle minute or conic.—Species 30, in Africa, Asia, and N. Australia.

Sect. 1. **Euthunbergia.** *Flowers* axillary. *Calyx* 10–16-toothed. *Seeds* ovoid, base excavate.

1. **T. fragrans,** *Roxb. Cor. Pl.* i. 47, t. 67, and *Fl. Ind.* iii. 33; leaves ovate or oblong acute, calyx-teeth in flower lanceolate hardly longer than the tube, capsule glabrous. *Lamk. Ill.* t. 549, fig. 2; *Wall. Cat.* 767, *type sheet*; *Nees in Wall. Pl. As. Rar.* iii. 77, 78, and in *DC. Prodr.* xi. 57; *T. Anders. in Journ. Linn. Soc.* ix. 448; *Kurz For. Fl.* ii. 240. T. javanica, *Gaertn. f. Fruct.* iii. 22, t. 183; *Blume Bijd.* 806; *Nees in DC. l. c.* 56. T. scandens, *Pers. Syn.* ii. 179. T. volubilis, *Pers. Syn.* ii. 179; *Nees in DC. l. c.* 59. T. angustifolia, *Ham.*; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. l. c.* 56. T. Roxburghia, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. l. c.* 58. T. subsagittata, *Blanco Fl. Fil.* 518. T. arnhemica, *F. Muell. Fragm. Phyt. Austral.* ix. 73.

Throughout INDIA, alt. 1–4000 ft., from the Himalaya Terai to CEYLON and Tenasserim; ascending to 5–7000 ft.—DISTRIB. Malaya to the Philippines and N. Australia.

Stem slender, retrorsely hairy or glabrate. *Leaves* 2–3 by $\frac{1}{2}$–$1\frac{1}{2}$ in., obtuse, base cordate or hastate, toothed, mature glabrate; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Pedicels* 1–3 in., 1 rarely 2 in each axil; bracteoles $\frac{3}{4}$ in., broadly falcate-oblong, subacute. *Calyx* in flower $\frac{1}{6}$ in., divided half-way down into 12–16 teeth, nearly glabrous, in fruit $\frac{1}{3}$ in. *Corolla* $1\frac{1}{4}$ in., pure white, fragrant. *Anther-cells* elliptic, acute, base unappendaged. *Ovary* glabrous; style funnel-shaped, 2-lipped. *Capsule* $\frac{3}{4}$–1 in., glabrous, shining. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., rugose.—The typical *T. fragrans* of the Bengal Terai is considered by T. Anderson, from the pure white of its fragrant flowers, the most charming of Bengal

plants. According to him (in *Thwaites Enum.* 234) the plant is not fragrant in Ceylon; but this may apply to *Var. vestita.*

VAR. *lævis*; glabrous or grey puberulous, pedicels often 2 in each axil much thickened upwards in fruit, corolla not fragrant, tube often greenish, capsules grey puberulous. T. lævis, *Nees in Wall. Pl. As. Rar.* iii. 77, and in *DC. Prodr.* xi. 56. T. fragrans, *Bot. Mag.* t. 1881; *Dalz. & Gibs. Bomb. Fl.* 183. T. longiflora, *Benth. in Pl. Hohenack.* 384. Meyenia longiflora, *Benth.; Hohenack. in Flora*, 1849, 558.—Deccan Peninsula, extending to Behar and W. Bengal.

VAR. *vestita*, Nees in Wall. Pl. As. Rar. iii. 78, and in DC. Prodr. xi. 57; stem and leaves more hairy, capsule pubescent.—S. Deccan Peninsula and Ceylon.

VAR. *heterophylla*; leaves subentire lower suborbicular upper narrow-elliptic acute uppermost lanceolate sometimes almost linear. T. heterophylla, *Wall. Cat.* 771.—Prome Hills and Ava; *Wallich.*—Possibly a distinct species, but the material is fragmentary; the calyx is 12-toothed, and the pedicel solitary axillary, so that it is hence near *T. fragrans.*

2. **T. tomentosa,** *Wall.*; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 58; leaves ovate or oblong acute, calyx-teeth in flower filiform much longer than the tube hairy, capsule villous. *T. Anders. in Journ. Linn. Soc.* ix. 449. T. fragrans, *Wall. Cat.* 767, *partly.*

NILGHERRIES, alt. 6500 ft.; *Wight, Sir F. Adam, Hohenacker,* &c.

Calyx-teeth in flower often ¼ in. *Bracts* 1 in., ovate, acute. *Corolla* pure white, tube 1½ in., mouth 2 in. diam. *Ovary* densely shortly villous. *Capsule* 1–1⅓ in.—Closely allied to *T. fragrans*, differing by the filiform calyx-teeth and large villous capsule. The thickening of the peduncles upwards in fruit, insisted on by T. Anderson, is more prominent in *T. fragrans* var. *lævis.*

*3. T. ALATA; *Bojer*; *Hook. Exot. Fl.* t. 177; softly villous, leaves ovate-cordate, petiole often winged, corolla orange-yellow with a brown or claret eye. *Wall. Cat.* 7141; *Bot. Mag.* t. 2591; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 58; *T. Anders. in Journ. Linn. Soc.* ix. 449; *Kurz For. Fl.* ii. 240.

INDIA, widely cultivated; naturalized in lower Assam and N.E. Bengal.—DISTRIB. Native of Africa.

Closely allied to *T. fragrans*, and often confounded with it. It is certainly African, and only introduced in India.

Sect. 2. **Meyenia.** *Flowers* axillary, rarely imperfectly racemed. *Calyx* an entire or scarcely toothed ring. *Seeds* ovoid, base excavate.

4. **T. Hawtayneana,** *Wall. Tent. Fl. Nep.* 49, *in note*, and *Cat.* 769, and *Pl. As. Rar.* ii. 52, t. 164; nearly glabrous, leaves sessile cordate-elliptic or -ovate-acute entire, pedicels short, corolla purple. T. Hawtaynii, *T. Anders. in Journ. Linn. Soc.* ix. 448. Meyenia Hawtayniana, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 60; *Wight Ill.* t. 164 b, fig. 1, and *Ic.* t. 1487.

Hills of the S. DECCAN PENINSULA; Canara, Bellary, Dharwar, Mangalore, Nilgherries, Kurg; *Wight*, &c.—CEYLON; *Walker.*

Stem slender. *Leaves* 3 by 1¼ in. *Pedicels* ¼–1¼ in., solitary, a tuft of hair at their base; bracteoles ¾–1 in., ovate-oblong, nerved. *Corolla* 1½ in., nearly glabrous, violet-purple, tube yellowish. *Filaments* with shortly stalked glands continued to the connective; anther-cells of the shorter stamens parallel, subsimilar, unappendaged; of the longer divergent, the upper oblique cell shortly mucronate at the base. *Stigma* funnel-shaped; lobes 2, oblong. *Capsule* 1–1¼ in., glabrous; seeds (ex Wallich) semiglobose.—In one example of Wight's, the flowers are on axillary branches 2–4 in. long, the floral leaves are reduced by degrees down to ½ in. long, i.e. to "bracts," and the inflorescence becomes a raceme.

5. **T. lutea,** *T. Anders. in Journ. Linn. Soc.* ix. 448; leaves ovate acuminate or lanceolate toothed, pedicels longer than the petioles, corolla yellow or greenish-white.

SIKKIM, alt. 4–7000 ft., frequent; *J. D. H.*, &c.

Pubescent or nearly glabrous. *Stem* slender. *Leaves* 6 by 4 in. or (especially upper ones) on the same stem 4 by ⅜ in., wide or cuneate, decurrent at the base, feather-nerved; petiole 1–2 in. *Pedicels* 1½–4 in., solitary, glabrous or pubescent, with a tuft of hairs at the base; bracteoles ½–⅔ in., broadly ovate or round, herbaceous, connate when young. *Calyx* minute, shorter than the small pedicel within the bracteoles, crenulate. *Corolla* 1½ in., glabrous, usually a faint yellow, greenish below. *Stamens* 4, subsimilar, fifth rudimentary; filaments hairy at the base, glandular upwards; anther-cells lanceolate, subpendent, separate below, sparingly hairy, white, cells with a round green ciliate basal appendage. *Style* bifid, branches short, linear, subequal, stigmas subcapitate.

Sect. 3. **Hexacentris.** *Flowers* racemed, or the lower axillary. *Calyx* an entire or obscurely crenulate ring. *Seeds* dorsally compressed, base plane.

6. **T. grandiflora,** *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 34; leaves ovate or uppermost lanceolate often angular or lobed scabrid or pubescent palmately 5–7-nerved, bracts deciduous lower often petioled leaf-like, corolla blue. *Wall. Cat.* 768, *type sheet*; *Bot. Mag.* t. 2366; *Bot. Reg.* t. 495; *Nees in Wall. Pl. As. Rar.* iii. 77, and in *DC. Prodr.* xi. 54; *Dalz. & Gibs. Bomb. Fl. Suppl.* 70; *Wight Ic.* t. 872; *T. Anders. in Journ. Linn. Soc.* ix. 447; *Kurz For. Fl.* ii. 240. T. cordifolia, *Nees l. c.* 55. Flemingia grandiflora, *Rottl. & Willd. in Nov. Act. Nat. Cur.* iv. 1803 (*fide Nees*).

BENGAL, alt. 0–4000 ft.; from Behar and Sikkim to Assam, Muneypoor and Chittagong, frequent.—DISTRIB. N. Burma (cult.? in China, Singapore, Bombay, &c.).

A large climber; uppermost leaves often passing into bracts. *Leaves* 6 by 3 in., acute, base cordate, toothed, often angularly lobed, pubescent, rarely glabrate; petiole 3 in. *Racemes* usually stout, pubescent, angular, somewhat dense-fld., or more slender, elongate, nearly glabrous; upper bracts small, inconspicuous; pedicels ½–3 in., opposite or fascicled; bracteoles ¾–1¼ in., falcate-elliptic, acute, often cohering on one margin. *Calyx* subentire. *Corolla* 2–3 in. long and broad. *Filaments* widened below; anthers subsimilar, ¼–⅓ in. long, bearded; cells parallel with a fine linear basal spur. *Ovary* pubescent or glabrescent; stigma very large, funnel-shaped; lobes 2, rounded. *Capsule* 1–2 in., pubescent or glabrous. *Seeds* flat, ⅛ in. diam., subtrigonous, covered (except the large base) with soft brown scaly plates.—Ordinary forms are easily distinguished by the pubescent angular leaves and pubescent raceme; but some Khasian examples are altogether glabrate with entire elliptic acute leaves; and, except by the leaves being 5–7-nerved rather than 3-nerved at the base, they might be placed with *T. laurifolia*.

VAR.? *axillaris*; leaves cordate-ovate acute glabrate, pedicels axillary 2–3 in. 1-fld., capsule and seeds as of *T. grandiflora*.—Khasia; Theria Ghaut, *Clarke*.—Stems very slender for *T. grandiflora*; corolla noted yellow (but ?). Marked by Kurz as a new species; but the examples do not show the ends of the branches.

7. **T. laurifolia,** *Lindl. in Gard. Chron.* 1856, 260; glabrous or innovations puberulous, leaves elliptic or oblong acuminate sinuate or denticulate palmately 3-nerved, bracts deciduous, corolla blue. *Bot. Mag.* t. 4985; *T. Anders. in Journ. Linn. Soc.* ix. 447, *excl. syn. Nees*; *Kurz For. Fl.* ii. 240. T. grandiflora, *Wall. Cat.* 768, *partly*. T. Harrisi, *Hook. Bot. Mag.* t. 4998.

MALAY PENINSULA, from Arracan to Malacca; *Wallich, Griffith*, &c. ANDAMANS; *Kurz*.

Resembling altogether *T. grandiflora*, but leaves narrower. *Seeds* very rugose, hardly scaly.—T. Anderson refers here "partly" *Hexacentris acuminata*, Nees, which is founded on *Wall. Cat.* 7140, collected in Silhet or Khasia, and described as having the leaves distinctly 5-nerved.

8. **T. coccinea,** *Wall. Tent. Fl. Nep.* 49, 58, t. 37, and *Cat.* 766; nearly glabrous, leaves elliptic acuminate toothed palmately 3–5-nerved, racemes elongate pendent, bracts subpersistent lower subsessile lanceolate, corolla red. *Don Prodr.* 120; *Hook. Exot. Fl.* t. 195; *Bot. Mag.* t. 5124; *T. Anders. in Journ. Linn. Soc.* ix. 448. T. pendula, *Hassk. Cat. Hort. Bogor.* 147. Hexacentris acuminata, *Nees*; *Wall. Cat.* 7140. H. coccinea, dentata & acuminata, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 61.

HIMALAYA, alt. 2–7000 ft., from Kumaon to Bhotan, frequent; *Wallich*, &c. ASSAM; *Griffith*. KHASIA MTS., alt. 1–4000 ft., frequent; *H. f. & T.*, &c. TENASSERIM; *Beddome*.—(Ceylon, &c., cultivated.)

A large climber; pendent branches often 10–25 ft., terminated by racemes. *Leaves* 5–8 in., lower ovate, upper oblong, obtuse cordate or angular at the base; petiole ½–2 in., or of the uppermost leaves 0. *Racemes* 6–18 in., lax, pendent; bracts ½–1 in.; pedicels ¼–1½ in., opposite or fascicled; bracteoles ⅓–1 in., broadly oblong or ovate, subacute, often coherent on one side, blackish or purple. *Calyx* a minute rim. *Corolla-tube* 1 in., lobes ¼ in. round, from red to orange-rose. *Filaments* glabrous, linear, a tuft of hairs at the base; anther-cells parallel; anthers of the longer filaments have 1 cell long-spurred at base, 1 short-spurred or spurless; anthers of the shorter filaments muticous or with 1 cell shortly spurred. *Style-arms* linear; stigmas subcapitate. *Capsule* 1–1½ in., minutely pubescent or nearly glabrous. *Seeds* nearly ⅓ in. diam., subhemispheric (or at least thicker than those of *T. grandiflora*), rugose not scaly; base plane.—Nees' description is very erroneous.

9. **T. mysorensis,** *T. Anders. in Journ. Linn. Soc.* ix. 448; nearly glabrous, leaves elliptic acuminate toothed palmately 3-nerved, racemes elongate pendent, bracts small deciduous, corolla yellow. Hexacentris mysorensis, *Wight Ic.* t. 871; *Bot. Mag.* t. 4786; *Dalz. & Gibs. Bomb. Fl.* 183.

NILGHERRIES and MYSORE; *Wight*, &c.

An extensive climber; branches pendent. *Leaves* 6 by 1–3½ in., base cuneate or rounded, strongly 3-nerved, a slender outer pair of nerves sometimes added; petiole ¼–1½ in. *Racemes* elongate, lax, long- or short-peduncled; bracts ⅛–½ in., linear-lanceolate, inconspicuous; pedicels ¼–1½ in.; bracteoles 1 in., falcate-elliptic, subacute, often coherent on one side, purplish-green. *Corolla* 1½ in., mouth 2 in. diam.; tube purplish, limb yellow; in cultivation sometimes with a red border (*Paxt. Fl. Gard.* iii. t. 88). *Anthers* subsimilar; cells parallel, hairy, all spurred at base. *Stigma* funnel-shaped, margin somewhat 2-lipped. *Capsule* 1¼ in., glabrous. *Seeds* ¼ in. diam., rugose.

10. **T. Wightiana,** *T. Anders. in Journ. Linn. Soc.* ix. 448; nearly glabrous, leaves ovate acuminate toothed palmately 3–5-nerved, bracts inconspicuous, bracteoles large cordate-orbicular nerved, corolla light blue. Schmidia bicolor, *Wight Ic.* t. 1848.

NILGHERRIES; Sisparah, *Wight, Beddome*.

An extensive climber. *Leaves* 5 by 3½ in., base rhomboid or rounded; petiole 1–2 in. *Racemes* axillary or from nodes of the old wood, 6–12 in.; bracts ⅛–⅓ in., linear-lanceolate, deciduous; pedicels opposite, 1 in., 2-ranked, curved; bracteoles 1 by 1¼ in., obtuse with a mucro, purple and cream-coloured (Wight). *Corolla* 1½–1¾ in., somewhat narrowly tubular, mouth 1¼ in. diam. *Anthers* subsimilar; cells parallel, glabrous, spurred at the base. *Ovary* and style glabrous; stigma funnel-shaped, hardly 2-lobed. *Fruit* not seen.

II. ELYTRARIA, *Vahl.*

Herbs, nearly stemless. *Leaves* alternate, crowded, subradical. *Scapes* covered by imbricated bracts; spikes close, rigid, simple or divided; bracts spirally imbricate, not opposite; bracteoles smaller than the bracts. *Calyx* sub-4-partite, segments unequal, the largest sometimes 2-fid. *Corolla* small, white or blueish; tube linear, limb 2-lipped; lobes 5, oblong, imbricate in bud. *Stamens* 2 perfect, attached in the corolla-throat; anthers elliptic, acute; cells 2, parallel, with or without a minute spur at the base. *Style* shortly 2-lobed; ovules 6–10 in each cell, superimposed. *Capsule* ellipsoid, acute. *Seeds* minute, ovoid, reticulated, minutely papillose, attached at a minute point without retinacula.—Species 3–4, American, whereof 1 is widely spread in tropical Africa and Asia.

E. crenata, *Vahl Enum.* i. 106; leaves obovate or elliptic obtuse crenate, bracts elliptic acuminate to a single sharp point. *Wall. Cat.* 2420; *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 63; *T. Anders. in Journ. Linn. Soc.* ix. 449; *Dalz. & Gibs. Bomb. Fl.* 183. E. lyrata, *Vahl l. c.* E. virgata, *Vahl l. c.*; *Nees in DC. Prodr.* xi. 63. E. marginata, *Beauv. Fl. Owar.* ii. 58, t. 93; *Nees in DC. l. c.* 63. E. indica, *Pers. Syn.* i. 23. E. Vahliana, *Michx Fl. Bor. Am.* i. 9, t. 1. Justicia acaulis, *Linn. f. Suppl.* 84; *Roxb. Cor. Pl.* ii. 15, t. 127, and *Fl. Ind.* i. 119.

DECCAN PENINSULA and CEYLON, common southwards; extending north to Delhi, and to the E. Himalaya, *Griffith.*—DISTRIB. Tropical and S. Africa; tropical and N. America.

Stem 0–2 in., woolly. *Leaves* 2–5 in., sometimes obtusely lobed, pubescent at least on the nerves beneath, sessile or narrowed into a petiole. *Scapes* several, 3–10 in., clothed with bract-like scales. *Spikes* $\frac{1}{2}$–4 in., harsh, simple or branched; bracts $\frac{1}{3}$ in., margins scarious, ciliate; bracteoles $\frac{1}{6}$ in., scarious, ciliate. *Calyx* $\frac{1}{6}$ in.; segments lanceolate, scarious, ciliate, the broad one entire at the apex. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., white or blueish. *Anthers* muticous at the base; rudiments of 2 barren stamens sometimes (at least) present. *Capsule* $\frac{1}{4}$ in., rigid; valves resilient.—The stem is in African examples sometimes considerably elongate branched, and in American examples the scape is sometimes very tall.

III. NELSONIA, *R. Br.*

A diffuse, softly villous herb. *Leaves* opposite, elliptic, entire. *Spikes* ovate or cylindric; bracts ovate, glandular-villous, closely imbricate, alternate or spirally scattered; bracteoles 0. *Sepals* 4, unequal, lanceolate, the larger often bifid. *Corolla* very small, purplish rose or white; tube slender, limb 2-lipped; lobes 5, obtuse, patent. *Stamens* 2, attached above the middle of the tube; anthers 2-celled, subincluded; cells broadly ellipsoid, distinct, more or less divergent, glabrous or ciliate, muticous or minutely spurred. *Stigma* very shortly 2-lobed; ovules in each cell 8–10. *Capsule* oblong, acute, bearing seeds from the base, barren upwards. *Seeds* small, roundly ellipsoid, smooth with granular marks, attached on minute points without retinacula.

N. campestris, *Br. Prod.* 481; *Endl. Iconogr.* t. 79; *Benth. Fl. Austral.* iv. 543. N. tomentosa, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 65; *Griff. Notul.* iv. 132; *Dalz. & Gibs. Bomb. Fl.* 183; *T. Anders. in Journ. Linn. Soc.* ix. 450. N. origanoides, *Roem. & Sch. Syst.* i. 173. N. lamiifolia, *Spreng. Syst.* i. 42. N. canescens, *Nees in DC. l. c.* 67.

N. villosa, senegalensis & Smithii, *Oersted in Vidensk Meddel. Kjobenh.* (1854) iv. 117, 118, t. 4, fig. 3–18. Justicia canescens & brunelloides, *Lamk. Ill.* i. 40, 41. J. hirsuta, *Vahl Enum.* i. 122. J. lamifolia, *Koen.*; *Roxb. Fl. Ind.* i. 134. J. tomentosa, *Wall. Cat.* 2370. (Other American, African and Australian synonyms omitted.)

Throughout INDIA, alt. 0–4000 ft., from the Himalaya to Ceylon and Malacca, common: not in western desert India.—DISTRIB. S.E. Asia, Australia, Africa, America.

Stems mostly short, with petioled leaves often 4–8 in. long; flowering stems trailing, 1–3 ft., with subsessile leaves ½–2 in. *Spikes* ½–2 in., mostly sessile, terminal on lateral branches; bracts ⅙ ¼ in., obtuse, berbaceous. *Calyx* ⅛ in., green, striate, hairy or subscarious. *Corolla* ⅙ in. *Ovary* and style glabrous. *Capsule* ⅙–⅕ in., 8–12-seeded. *Seeds* yellowish with brown granulations.—The picture of the seed by Kippist in *Trans. Linn. Soc.* xix. t. 6, fig. 11, showing the surface with hammer-headed spines, is erroneous.

VAR. *vestita*; suberect, hairy, leaves very large, corolla-lobes acute. N. vestita, *Roem. & Sch. Syst.* i. *Mant.* 145. Justicia tomentosa, *Roxb. Hort. Beng.* 4, and *Fl. Ind.* i. 131. J. bengalensis, *Spreng. Syst.* i. 82. Dianthera tomentosa, *Roxb. Ic. Ined. in Herb. Kew.*—Pegu; *M'Lelland, Brandis,* &c.—Cauline *leaves* attaining 10 in., uppermost 3–5 in.; petiole 2 in. *Bracts* elliptic, acute.—Dr. King says that it is very easy to distinguish this from every form of *N. campestris*, but that he can give no good character for it, and that it had better be regarded as an extreme form of that plant. Roxburgh says the capsule is 4- or 8-seeded; it is really as that of *N. campestris* type.

IV. **EBERMAIERA,** *Nees.*

Herbs or small undershrubs. *Leaves* opposite (in *E. glauca* alternate), entire or nearly so. *Spikes* or *racemes* terminal or quasi-axillary, simple or compound, dense or lax; bract at the base of the pedicel leaf-like or overtopping the flower or small inconspicuous; bracteoles 2 near the base of the calyx, smaller than the bract. *Sepals* 5, oblong or linear, subequal or one larger. *Corolla-tube* elongate, cylindric (in *E. coriacea* & *parviflora* short-funnel-shaped); lobes 5, short, patent. *Stamens* 4, didynamous, included in the corolla-tube (in *E. coriacea* & *parviflora* shortly exsert); filaments patently hairy (in *E. parviflora* glabrous); anther-cells 2, ovoid, separate, muticous. *Disc* inconspicuous. *Ovary* glabrous or nearly so; style linear glabrous; lobes 2, oblong, the lower frequently again 2-lobed; ovules very many. *Capsule* small, oblong, bearing seeds from the base to near the apex. *Seeds* 15–30 in each cell, small, globose or cuboid; hilum a minute hollow; retinacula 0; unripe glandular, ultimately nearly smooth or with obscure shallow pits; albumen thin, cartilaginous (Benth.).—Species 40, in S.E. Asia, Malaya, Australia, and Brazil.

* *Flowers sessile or subsessile, spikes elongate or capitate rarely divided, sepals ¼ in. or more one often distinctly larger than the others.*

1. **E. glauca,** *Nees in DC. Prodr.* xi. 73; stem patently viscous-pubescent upwards, leaves petioled spathulate-oblong upper alternate, spikes elongate lax interrupted below, lower bracts petioled linear-spathulate much exceeding the flowers, corolla ¼–⅓ in. *Wall. Cat.* 9083; *Wight Ill.* t. 164 b, fig. 2, and *Ic.* t. 1488; *Dalz. & Gibs. Bomb. Fl.* 184; *T. Anders. in Journ. Linn. Soc.* ix. 450, *in some part* and *excl. syn.* E. ligulata, *Bedd. Ic. Pl. Ind. Or.* t. 245.

W. DECCAN PENINSULA and S. MADRAS, frequent; *Wight,* &c. BENGAL; Darjeeling Terai, *Clarke.* TENASSERIM; *Beddome.*

Stems 12–15 in.; lower leaves and branches opposite or leaves nearly all alternate.

Leaves 2 by ⅗ in., obtuse, base attenuate, slightly viscous-pubescent or glabrate, entire or sinuate; petiole ¼ in. *Spikes* 2–6 in.; lowest bracts altogether leaf-like (whence T. Anderson says "flowers solitary axillary"); tip of the spike often dense with short bracts resembling the spike of neighbouring species; bracteoles linear, obtuse, shorter than the calyx. *Sepals* 4 subsimilar, ¼ in., linear-subulate, sparsely glandular-hairy; the fifth longer, much broader, linear-oblong, obtuse. *Corolla* straight, slightly pubescent without, purplish with rose or yellow stripes. *Anther-cells* muticous or minutely mucronate at base. *Capsule* ⅕ in.—Described from Nees' type specimen; Wight's figure is taken from a form having a much denser more glandular-pubescent spike. The Australian species referred here by T. Anderson and Bentham differs in its hairy ovary and capsule, and many other minute points; but it might be better to unite it, and make a wholesale reduction of species here.

VAR. *spatulata*; leaves very spathulate, spikes denser only a few of the lowest elongate, calyx and bracteoles very glandular-hairy, corolla scarcely ¼ in. Adenosma spatulatum, *Blume Bijd.* 757. Ebermaiera spatulata, *Hassk.*; *Nees in DC. Prodr.* xi. 74, partly ?.—Pegu; *Kurz.* Tenasserim; *Beddome.* Bengal; Pubna, *Clarke.* —Distrib. Java.—Growing in rice-swamps; stems erect, thick, quadrangular or striate; many or nearly all the leaves alternate.—*Ebermaiera spatulata*, Nees, is described from a Philippine plant of Cuming's, which widely differs from Kurz's Pegu specimens.

2. **E. polybotrya,** *Nees in DC. Prodr.* xi. 74; stems erect adpressedly grey-pubescent upwards, leaves elliptic subobtuse at both ends, spikes cylindric not lax downwards, bracts narrowly oblong scarcely exceeding the calyx, corolla ¼ in.

BENGAL; frequent in Terai swamps in Sikkim and Silhet, *J. D. H.*, &c. MOULMEIN and MERGUI; *Griffith.*

Stems 6–8 in., often branched from the base. *Leaves* all opposite, even at the base of the spike, 1¼ by ⅜ in., subentire, minutely pubescent on the nerves beneath or glabrous; petiole 0 or in the lower leaves scarcely ⅛ in. *Spikes* 1¼ in.; bracts ¼–⅓ in.; bracteoles linear, shorter than the calyx. *Sepals* 4 subsimilar, narrow-linear, subobtuse; the fifth rather longer, much broader, oblong, obtuse. *Corolla, stamens,* and *capsule* nearly as of *E. glauca.*

3. **E. humilis,** *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 74; stem erect branched adpressed white-pubescent upwards, leaves opposite subsessile narrowly elliptic, heads terminal small globose, bracts oblong sessile hardly so long as the calyx, corolla ⅓ in. and upwards. *Wall. Cat.* 7148; *T. Anders. in Journ. Linn. Soc.* ix. 450.

BURMA; Prome Hills, *Wallich.*

Stem 6–8 in., branched from near the base; branches ascending, shorter than the central stem. *Leaves* 1¼ by ½ in., obtusely rhomboid at both ends, nearly glabrous, adpressedly white-pubescent on the nerves beneath; petiole hardly $\frac{1}{12}$ in. diam. *Heads* sessile, ½–¾ in. diam.; bracts and bracteoles ¼ in. *Sepals*, 4 linear, subobtuse; the fifth slightly larger, oblong obtuse.—Nearly allied to *E. polybotrya*, but the heads are not elongate cylindric, the bracteoles and sepals are less acute, the corolla is larger.

4. **E. glutinosa,** *Wall. Cat.* 9087; stem trailing rooting pubescent, leaves elliptic, base attenuate, heads subspherical on short branches and quasi-axillary, bracts elliptic sessile hardly so long as the calyx, corolla ½ in. Ebermaiera sp., *Wall. Cat.* 9085. E. glauca, *T. Anders. in Journ. Linn. Soc.* ix. 450, *in great part.*

CENTRAL INDIA, N.W. PROVINCES, and BENGAL, frequent; Moradabad, *Thomson*; Behar, *J. D. H.*; Bundelcund, *Edgeworth*; Silhet, *Wallich*, &c.

Stems numerous, 12–18 in.; nodes in the trailing branches distant. *Leaves* all (or nearly all) opposite, 1½ by ⅗ in., subobtuse, entire, minutely pubescent or glabrous;

petiole 0–¼ in. *Heads* 2–8-fld.; bracts ½ in.; bracteoles ¼ in., narrowly obovate-oblong. *Sepals* 4, linear, subobtuse, viscidly pubescent; the fifth slightly longer, oblong, obtuse. *Corolla* blueish with dark veins. *Ovary* minutely pubescent upwards; one stigma-lobe oblong, the other bifid.—Easily separated from *E. glauca* by its habit, opposite leaves and large flowers.

5. **E. zeylanica,** *Nees in DC. Prodr.* xi. 74; trailing branches pubescent, leaves elliptic subobtuse narrowed at the base, spikes cylindric, bracts obovate slightly longer than the flowers, corolla ¼–⅓ in. *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. syn.* E. glauca, *T. Anders. in Thwaites Enum.* 224, *not in Nees.* Erythracanthus elongatus, *Dalz. & Gibs. Bomb. Fl.* 184, *not of Nees.*

W. DECCAN PENINSULA and CEYLON; Concan, *Dalzell, Stocks*, &c. CEYLON; *Macrae, Thwaites.*

Stem erect, short, with large leaves, and flowering runners with much smaller leaves. *Leaves* 3 by 1 in., subentire, sparsely hairy on both surfaces, or glabrate with nerves beneath pubescent; petiole ⅓ in., or in the leaves of the lateral branches 0. *Spikes* 1–2 in., dense; bracts ⅓ by ⅛ in., obtuse, apiculate, strongly 1-nerved; bracteoles ⅓ in., linear-spathulate. *Sepals* 4, linear, rather shorter than the bracts; the fifth rather broader, linear, subacute. *Corolla*, stamens, and capsule nearly as of *E. glauca.*

6. **E. thyrsoidea,** *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 75; stem erect hairy, leaves petioled elliptic-spathulate subobtuse, spikes cylindric thyrsoid, bracts oblong very acute scarcely longer than the flowers, corolla ⅓ in. *Wall. Cat.* 7149. E. zeylanica, *T. Anders. in Journ. Linn. Soc.* ix. 451, *partly.* E. diffusa, *Kurz in Journ. As. Soc.* 1871, pt. ii. 74. Capraria diffusa, *Roxb. Fl. Ind.* iii. 93, fide Kurz.

EAST FRONTIER from Cachar, *Keenan*, to Tenasserim, *Beddome*; plentiful in Chittagong, *J. D. H.*, &c.

Stem 8–18 in., decumbent at the very base, then erect, longer than the ascending branches. *Leaves* 3 by ¾ in., hairy. *Spikes* axillary and terminal 1–4 in.; pedicels of the lower flowers $\frac{1}{10}$–⅓ in.; bracteoles with fine hairs often ⅙–¼ in. long. *Sepals* 4, subsimilar, linear, with fine long hairs; the fifth longer, narrowly lanceolate, twice as broad. *Corolla* (at least often) white or very nearly so. Otherwise as *E. zeylanica*, with which T. Anderson united this species; but it appears amply distinct.

7. **E. incana,** *Hassk. Hort. Bogor.* 147; stem short suberect scarcely branched, leaves petioled elliptic shortly softly hairy on both surfaces, spikes cylindric, bracts lanceolate shorter than the calyx not aristate, corolla ½ in. E. velutina, *Nees in DC. Prodr.* xi. 76; *T. Anders. in Journ. Linn. Soc.* ix. 452.

MERGUI; *Griffith.* TENASSERIM (or Andamans), *Helfer* (Kew Distrib. n. 6080). —DISTRIB. Java?

Stem decumbent, base almost woody, then erect, 3–4 in., closely rusty-villous. *Leaves* 4 by 1½ in., obtuse, base narrowed, subentire; petiole ½–1 in. *Spikes* 1–1½ in., dense; bracts ¼ in.; bracteoles ⅙ in., broadly lanceolate, closely softly hairy. *Sepals*, two ⅙ in. linear, two nearly ⅕ in. linear, one ⅕ in. lanceolate; all slightly pubescent and ciliate. *Corolla* and stamens nearly as in *E. glutinosa. Capsule* ¼ in.—Nees says that this is nearly the same as *E. incana*, Hassk., of which I have seen no specimen; and Kurz says (Journ. As. Soc. 1870, pt. ii. 78) that it is quite the same. By habit, bracts and indumentum it approaches *E. macrophylla*, T. Anders.

8. **E. lanceolata,** *Hassk. Hort. Bogor.* 147; stems short branched suberect, leaves oblong or narrowly elliptic cuneate at both ends glabrate or minutely pubescent beneath, spikes cylindric dense, bracts oblong acute

pubescent hardly ciliate, calyx ciliate shorter than the bract, corolla ½ in. and upwards. *Nees in DC. Prodr.* xi. 76; *Kurz in Journ. As. Soc.* 1870, pt. ii. 78. E. argentea, *Nees l. c.*; *T. Anders. in Journ. Linn. Soc.* ix. 451. Adenosma lanceolatum, *Blume Bijd.* 757. Staurogyne, *Wall. Cat.* 7489.

PENANG; *Wallich.* MALACCA; *Griffith.* TENASSERIM (or Andamans), *Helfer* (Kew Distrib. n. 6077).—DISTRIB. Java.

Stems 3–6 in., base almost woody, pubescent. *Leaves* 3 by ¾ in., narrowed to an obtuse apex, entire, sinuate, pubescent on the nerves beneath, and sometimes also slightly on the lamina; petiole ¼–½ in. *Spikes* 2 in., dense; bracts ⅜ in., not aristate; bracteoles ⅓ in., narrow-lanceolate, ciliate. *Sepals* 4, ⅓ in., linear; the fifth slightly longer and broader; all prominently ciliate. *Capsule* ¼ in.

9. **E. Staurogyne,** *Nees in DC. Prodr.* xi. 75; stem decumbent short, leaves narrowly elliptic whitened beneath, spikes short cylindric or capitate, bracts lanceolate 3-nerved long-aristate pubescent not ciliate, corolla ⅜ in. *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. all syn.* Staurogyne argentea, *Wall. Pl. As. Rar.* ii. 80, t. 186, and *Cat.* 4905.

KHASIA HILLS up to 3000 ft. alt., and N. SILHET, frequent; *Wallich, Griffith, H. f. & T.*, &c.

Stems 3–8 in., pubescent, prostrate, rooting, base almost woody. *Leaves* 4 by 1¼ in., subobtuse, base rounded or cuneate, entire, glabrous, nerves beneath prominent puberulous; petiole ½–1½ in. *Spikes* ½–2 in.; bracts ½ in. with awns ½ in.; bracteoles ⅓ in., linear, awns ⅓ in. *Sepals* ⅓ in., linear, awns ⅓ in. *Corolla* purple with rose marks. *Style* bifid, lower lobe 2-partite. *Capsule* ¼ in.

10. **E. angustifolia,** *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. many syn.*; stem decumbent short, leaves narrowly elliptic somewhat whiter beneath, spikes short cylindric or capitate, bracts lanceolate 3-nerved long-awned pubescent ciliate, awns of the bracteoles and sepals without hairs or cilia. E. Staurogyne β angustifolia, *Nees in DC. Prodr.* xi. 75. Staurogyne angustifolia, *Wall. Cat.* 4906.

CHITTAGONG, alt. 0–1000 ft., frequent; *H. f. & T.*, &c. PEGU; *J. Scott.* MOULMEIN; *Griffith.* RANGOON; *M'Lelland.* TENASSERIM; King's Island, *Helfer.*

Very near *E. Staurogyne*; but the long white cilia on the margin of the lanceolate portion of the bracts and bracteoles at flower-time give the heads a different aspect. The characters drawn from the breadth of the leaves and the cuneation of their bases fail; and Mr. Bentham has noted the species as perhaps only a var. of *E. Staurogyne.* T. Anderson has variously marked it, E. Staurogyne, setigera, angustifolia, and aristata. The awns of the bracteoles and sepals have very minute white adpressed bristles.

11. **E. setigera,** *Nees in DC. Prodr.* xi. 76; stems short branched, leaves short-petioled narrowly elliptic, spikes capitate, bracts almost linear, bracteoles and sepals subulate hairy nearly to their tip with patent long tawny hairs from bulbous bases, corolla ½ in. and upwards. *T. Anders. in Journ. Linn. Soc.* ix. 451. E. trichocephala, *Miq. Fl. Ind. Bat.* ii. 774.

MALACCA; *Cuming.*—DISTRIB. Sumatra, Borneo.

Stem 3–6 in., pubescent. *Leaves* 2 by ¾ in., cuneate, subobtuse at both ends, glabrous above, puberulous whiter beneath; petiole ¼–½ in. *Spikes* ½–1 in.; bracts ½–¾ in., linear, long-attenuate, subulate, scarcely awned, herbaceous not nervose (as in the two preceding species); bracteoles similar, but rather shorter. *Sepals* ½ in., linear-subulate, hardly aristate. *Capsule* ¼ in.; bracteoles and sepals less stellate in fruit than in *E. angustifolia.*—E. trichocephala, *Miq.*, is referred by Kurz (Journ. As. Soc. 1870, pt. ii. 78) to *E. lanceolata,* and by T. Anderson (Journ. Linn. Soc.

ix. 451) to *E. Staurogyne*; but from the description and habitat is surely *E. setigera*.

12. **E. longifolia,** *Nees in DC. Prodr.* xi. 76; leaves long-petioled lanceolate, spikes cylindric softly hairy, lower flowers somewhat pedicelled, bracts narrow-lanceolate attenuate subulate herbaceous hairy below minutely pubescent upwards, corolla $\frac{1}{2}$–$\frac{2}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 451.

MALACCA; *Griffith* (Kew Distrib. n. 6079), *Cuming*.

Branches 3–8 in., divided, pubescent; innovations white-silky, subtomentose. *Leaves* 5 by $1\frac{1}{2}$ in., narrowed to both ends, subobtuse, base cuneate, subentire, sinuate, glabrous above, puberulous whiter beneath; petiole $\frac{1}{2}$–2 in. *Spikes* 1–$2\frac{1}{2}$ in.; lower pedicels often $\frac{1}{8}$ in.; bracts $\frac{3}{8}$ in.; bracteoles similar but rather narrower and shorter. *Sepals* $\frac{1}{2}$ in., very like the bracteoles. *Capsule* $\frac{1}{4}$ in., rather broader than in the preceding species.

13. **E. axillaris,** *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 75; branches almost woody, leaves elliptic narrowed at both ends minutely punctate above, spikes cylindric drooping very hairy, bracts lanceolate acuminate hairy, corolla $\frac{1}{2}$ in. very hairy without. *T. Anders. in Journ. Linn. Soc.* ix. 452. Ruellia? comosa, *Wall. Cat.* 2414.

PENANG; *Wallich*.

Leaves 6 by $1\frac{1}{2}$–$2\frac{3}{4}$ in., subobtuse, base cuneate, nearly entire, glabrous, pubescent on the nerves beneath; petiole $\frac{1}{4}$–1 in. *Spikes* 2–4 in., dense, several among the penultimate leaves on the branch; bracts $\frac{1}{2}$ in., flaccid; pedicels hardly any; bracteoles resembling the bracts, but narrower and rather shorter. *Sepals* $\frac{1}{3}$ in., linear-lanceolate, acuminate, softly hairy. *Capsule* $\frac{1}{3}$ in.

*** Lower flowers of the racemes more or less distinctly pedicelled, racemes often panicled, sepals $\frac{1}{4}$ in. or more not very unequal.*

14. **E. Simonsii,** *T. Anders. in Journ. Linn. Soc.* ix. 451; leaves large elliptic narrowed at both ends, racemes panicled white-hairy, bracts linear, sepals linear covered to the tips on all sides with glistening white hairs, corolla $\frac{1}{2}$ in.

KHASIA HILLS; Bor Pani, alt. 2500 ft., *Simons*.

Stems 6 in., stout, woody, branched, villous upwards. *Leaves* 8 by $3\frac{1}{2}$ in., subobtuse, base cuneate, nearly entire, sparsely hairy or finally glabrate above, glabrous, paler beneath, puberulous on the nerves; petiole 1–2 in. *Racemes* dense, sparingly branched or laxly paniculate, 1–4 in.; bracts $\frac{1}{3}$ in., very narrowly linear, obtuse; pedicels often $\frac{1}{6}$ in.; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly linear. *Sepals* nearly $\frac{1}{2}$ in., two of them somewhat shorter. *Corolla* nearly glabrous without. *Capsule* $\frac{1}{4}$ in.

15. **E. Helferi,** *T. Anders. in Journ. Linn. Soc.* ix. 452, *chiefly*; stem short stout, leaves obovate-oblong closely minutely pubescent on the surface above and the nerves beneath, peduncles bearing 1 or several racemes, bracts petioled elliptic obtuse whitened membranous nearly glabrous, sepals linear obtuse nearly glabrous.

TENASSERIM; Attaran, *Helfer* (Kew Distrib. n. 6075). PEGU; Thoungyun, *Brandis*.

Stem 4 in., villous, simple. *Leaves* 9 by 5 in., obtuse, base attenuated, somewhat whitened beneath; petiole $\frac{1}{2}$–1 in. *Peduncles* 1–5 from the penultimate axils, 1–3 in., reddish, minutely pubescent. *Racemes* 1–3 in., somewhat dense; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., nervose; pedicels sometimes $\frac{1}{8}$–$\frac{1}{6}$ in.; bracteoles $\frac{1}{3}$ in., narrowly oblong, resembling the bract, upper shorter and narrower. *Sepals* 4, $\frac{1}{4}$ in., of which 2 rather shorter; the fifth rather longer, twice as broad, 3-nerved. *Corolla* $\frac{1}{2}$ in., glabrous or nearly so.

Capsule ¼ in.—T. Anderson l. c. describes one of the bracts as at the same time 1-nerved and 3-nerved, but he subsequently himself separated in the Herbarium his *E. macrophylla.*

16. **E. macrophylla,** *T. Anders. in Herb. Kew*; stem hardly any, leaves short-petioled obovate-oblong obtuse minutely closely pubescent on the surface above and on the nerves beneath, peduncle simple or branched, racemes slender pubescent, bracts and bracteoles small spathulate-elliptic herbaceous pubescent. E. Helferi, *T. Anders. in Journ. Linn. Soc.* ix. 452, *in part.*—Ebermaiera, *Wall. Cat.* 9086.

LOWER BURMA; Chappedong, *Wallich*; Moulmein, *Parish, Lobb.*

Stem 1–3 in., stout, villous. *Leaves* 7 by 4 in., base broadly rhomboid; petiole ⅛–⅜ in. *Peduncles* ¼ in.; spikes 3 in.; bracts ¼–⅓ in.; pedicels $\frac{1}{10}$ in.; bracteoles ⅕–¼ in., resembling the bracts, unequal. *Sepals* ⅙ in., linear, scarcely acute, pubescent. *Corolla* ½ in., glabrous or nearly so.—Exceedingly near *E. Helferi*, but the bracts and bracteoles are much smaller, not white membranous nervose.

17. **E. Griffithiana,** *T. Anders. in Journ. Linn. Soc.* ix. 452; stem short, leaves petioled elliptic rounded at both ends minutely closely pubescent above, racemes elongate panicled, bracts elliptic pubescent, sepals ⅓–½ in. linear. Erythracanthus Griffithianus, *Nees in DC. Prodr.* xi. 78. E. obtusus, *Wight Ic.* t. 1491, *not of Nees.*

MALACCA; *Griffith* (Kew Distrib. n. 6078).

Stem 3–6 in., herbaceous, branched, pubescent. *Leaves* 5 by 3 in., pubescent beneath or finally on the nerves only; petiole ½—1½ in. *Peduncles* 1–2 in., reddish; racemes up to 5 in.; bracts ½ by ⅓ in., hardly acute; pedicels 0–⅙ in.; bracteoles ⅓ by ⅛ in., similar to the bracts. *Sepals* subequal, narrowly linear, somewhat striate longitudinally. *Capsule* ½ in.

18. **E. elongata,** *Nees in DC. Prodr.* xi. 721; leaves oblong acute at both ends punctate obscurely pubescent above, racemes elongate lax, bracts linear-lanceolate, sepals ⅙ in. almost equal sublinear pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 452. Adenosma elongatum, *Blume Bijd.* 757. Erythracanthus elongatus, *Nees in DC. Prodr.* xi. 78, *excluding Var.* β.

PENANG; *Wallich* (fide T. Anderson).—DISTRIB. Java.

Stem 6 in., erect, pubescent. *Leaves* 6 by 2 in., obscurely pubescent beneath, herbaceous, concolorous or nearly so, nerves beneath inconspicuous; petiole 1–2¾ in. *Raceme* 10 in., branched near the base; bracts ⅙ by $\frac{1}{20}$ in., acuminate, scarcely awned; pedicels 0–⅙ in.; bracteoles ⅓ in., linear. *Corolla* ⅓–½ in., minutely pubescent without. *Capsule* nearly ½ in.—The example from Java marked *E. subpaniculata*, Hassk., is *E. elongata*, Nees; but it may perhaps be wrongly named, as the description of Hasskarl (in Retzia, 77) says inter alia that the leaves of *E. subpaniculata* are mostly alternate, much whitened beneath.

19. **E. lasiobotrys,** *Nees in DC. Prodr.* xi. 721; stem erect subtomentose upwards, leaves narrowly elliptic cuneate at both ends glabrate above, racemes elongate very lax, bract filiform very small, sepals ¼ in. linear with patent white hairs to the tips on all sides. *Wall. Cat.* 9084; *T. Anders. in Journ. Linn. Soc.* ix. 452.

LOWER BURMA; Chappedong Hills, *Wallich*; Mergui, *Griffith*; Moulmein, *Falconer*; Tavoy, *Parish.*

Stem decumbent, rooting, then 6–15 in. erect. *Leaves* 5½ by 2 in. (usually smaller), mature glabrous minutely pubescent on the nerves beneath; petiole ¼–¾ in. *Panicles* 6–12 in., straggling; racemes 2–5 in., lower flowers distant; bracts ⅛–⅙ in.;

lower pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* subequal, somewhat larger in fruit. *Corolla* $\frac{1}{2}$ in., narrow tubular, sparsely minutely hairy. *Capsule* $\frac{1}{4}$ in.

20. **E. paniculata,** *Wall. mss.*; *T. Anders. in Journ. Linn. Soc.* ix. 453; stem erect subtomentose upwards, leaves narrowly elliptic cuneate at both ends glabrate above, panicle compound, racemes lax, bracts filiform very small, sepals $\frac{1}{4}$ in. linear nearly glabrous.

MUNEYPOOR; *Hort. Calcutt.* S.E. ASSAM (or Ava), *Griffith* (Kew Distrib. n. 6082).
Stems 1 foot, woody, sometimes branched. *Leaves* 7 by 3 in. (often smaller) scarcely acute, prominently reticulated, pubescent on the nerves beneath; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Panicles* (including peduncles) 6–9 in., reddish, minutely pubescent; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., minutely pubescent; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* $\frac{1}{6}$ in. in flower, $\frac{1}{4}$ in. or more in fruit. *Corolla* $\frac{1}{3}$ in., slender, nearly glabrous. *Capsule* $\frac{1}{8}$–$\frac{1}{3}$ in.—Closely allied to *E. lasiobotrys*, but with smaller flowers and fruit, and the panicle without the abundant hair of *E. lasiobotrys*.
VAR. *glabrior*; leaves less reticulated, panicle thin very glabrous, sepals very slender glabrous.—Patkoy Mts., alt. 4000 ft.; *Griffith* (Kew Distrib. n. 6085).

21. **E. obtusa,** *T. Anders. in Journ. Linn. Soc.* ix. 453; stem short subtomentose, leaves elliptic rounded at both ends closely shortly hairy above, panicles compound shortly pubescent, bracts very small filiform, sepals $\frac{1}{5}$ in. linear minutely pubescent. Erythracanthus obtusus, *Nees in DC. Prodr.* xi. 78.

MERGUI; *Griffith* (Kew Distrib. n. 6083). MOULMEIN, *Falconer.*
Stem 3–4 in. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., very obtuse, base sometimes subcordate, beneath glabrous, the nerves pubescent; petiole $\frac{1}{4}$–2 in. *Peduncles* often numerous from the upper axils; panicles 3–5 in., racemes lax; bracts $\frac{1}{8}$–$\frac{1}{6}$ in.; lower pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* $\frac{1}{8}$ in. in flower, in fruit $\frac{1}{4}$ in. *Corolla* $\frac{1}{3}$ in., slender, minutely hairy. *Capsule* $\frac{1}{3}$ in.

22. **E. Maclellandii,** *T. Anders. in Journ. Linn. Soc.* ix. 454; stem erect branched, leaves oblong narrowed at the base obscurely pubescent above, panicles small numerous patently softly hairy lateral and terminal, bracts small oblong herbaceous, sepals $\frac{1}{5}$ in. linear patently hairy.

PEGU; *M'Lelland.*
Stems 6–12 in., herbaceous, pubescent. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, mature nearly glabrous; petiole 0–$\frac{1}{4}$ in. *Panicles* 1–2 in., on short branches beginning near the base of the stems; lower bracts passing gradually into leaves, upper scarcely $\frac{1}{4}$ in.; pedicels mostly short, some attaining $\frac{1}{6}$ in.; bracteoles $\frac{1}{6}$ in., narrowly oblong. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in.—Allied to *E. glauca* and *E. polybotrya*, but is driven to this position in the linear series by its slender racemes and subequal sepals.

*** *Racemes elongate, lax, calyx small* ($\frac{1}{8}$–$\frac{1}{6}$ in. long).

23. **E. racemosa,** *Miq. Fl. Ind. Bat.* ii. 775; stem erect somewhat stout, leaves narrowly elliptic cuneate at both ends minutely hairy above, racemes long simple or divided, sepals $\frac{1}{8}$ in. lanceolate minutely pubescent, corolla $\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 452. Ruellia racemosa, *Roxb. Fl. Ind.* iii. 42; *Wall. Cat.* 2336. Erythracanthus racemosus, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 78.

MALAY PENINSULA, from Moulmein southwards, and Penang, frequent; *Wallich*, &c.—DISTRIB. Java.
Stems attaining 15 in., branched, closely brown-villous. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in., scarcely acute, reddish brown, glabrous beneath, pubescent on the nerves; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. *Peduncles* 2–3 in., subterminal; racemes 2–5 in., often simple, sometimes divided; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., narrowly oblong or linear; pedicels sometimes $\frac{1}{8}$–$\frac{1}{6}$ in., often

hardly any, the raceme becoming altogether a spike; bracteoles smaller than the bracts. *Corolla* glabrous. *Capsule* $\frac{1}{4}$ by $\frac{1}{6}$ in.

24. **E. merguensis,** *T. Anders. in Journ. Linn. Soc.* ix. 452; stem very short, leaves obovate-oblong obtuse nearly glabrous, base cordate, panicles minutely pubescent, sepals $\frac{1}{8}$ in. lanceolate, corolla $\frac{1}{4}$–$\frac{1}{3}$ in.

MERGUI; *Helfer* (Kew Distrib. n. 6081).

Stem 1–3 in., closely villous. *Leaves* 3 by $1\frac{1}{4}$ in., tip rounded, subcoriaceous; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* several, 1–3 in., reddish; racemes 1–4 in., slender, simple or little divided, minutely pubescent or glabrate; bracts $\frac{1}{8}$ in., narrow-lanceolate; lower pedicels scarcely $\frac{1}{8}$ in.; bracteoles smaller than the bracts. *Corolla* narrow, glabrous. *Capsule* scarcely $\frac{1}{6}$ in., broad lanceolate.

25. **E. gracilis,** *T. Anders. in Journ. Linn. Soc.* ix. 453; stem hardly any, leaves short-petioled large obovate-oblong nearly glabrous, panicles slender pubescent, sepals $\frac{1}{8}$ in. sublinear, corolla $\frac{1}{2}$ in. (and upwards) narrowly tubular.

MARTABAN; *Parish.*

Leaves 8 by 3 in., obtuse, minutely pubescent on the nerves beneath; petiole 0–$\frac{1}{3}$ in. *Peduncles* several, 3–5 in., slender; panicles compound; bracts $\frac{1}{16}$ in., linear; pedicels 0–$\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., linear. *Sepals* minutely pubescent. *Corolla* glabrous without when expanded, or nearly so. *Capsule* $\frac{1}{4}$ in.

26. **E. coriacea,** *T. Anders. in Herb. Kew*; stem short closely villous, leaves elliptic nearly glabrous, raceme long densely softly minutely grey hairy, sepals $\frac{1}{8}$ in. lanceolate, corolla $\frac{1}{3}$ in. tube short, anthers shortly exsert.

MOULMEIN; *Lobb.*

Stem 4 in., almost woody at the base. *Leaves* 2 by 1 in., obtuse, base rhomboid, subcoriaceous, secondary nerves obscure; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Peduncle* $1\frac{1}{2}$ in.; raceme 4 in., many-fld.; bracts $\frac{1}{5}$ in., narrow-lanceolate; lower pedicels $\frac{1}{6}$ in.; bracteoles in., narrow-lanceolate. *Calyx* with dense soft, short, grey hair. *Corolla* with a very short cylindric base, a short funnel-shaped portion at the base of which the filaments are inserted, elliptic or oblong erect-patent lobes, closely patently glandular-hairy. *Stamens* and *pistil* of *Ebermaiera*; filaments densely patently hairy upwards. *Capsule* $\frac{1}{6}$ in., oblong, as of *Ebermaiera.*—The corolla is nearly as in *Ophiorrhizophyllum.*

27. **E. parviflora,** *T. Anders. in Herb. Kew*; stem very short, leaves obovate-oblong glabrate except the nerves beneath, panicle compound slender minutely hairy, sepals $\frac{1}{12}$ in. sublinear, corolla $\frac{1}{8}$–$\frac{1}{6}$ in. tube short, anthers subexsert.

MOULMEIN; *Lobb.*

Stem 1 in., subtomentose. *Leaves* 6 by $2\frac{1}{4}$ in., obtuse, base rhomboid or almost rounded; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Peduncle* 4 in., pubescent, with 9 scattered bracts $\frac{1}{3}$ in. long; panicle $4\frac{1}{2}$ by 3 in.; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., linear; lower pedicels scarcely $\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., subulate. *Corolla* as of *E. coriacea* but smaller, the external hairs shorter. *Filaments* glabrous except near the base; anther-cells ovoid, minutely puberulous. *Pistil* as of *E. coriacea.*—Closely allied to *E. coriacea,* but with much larger leaves, and smaller flowers.

28. **E. Beddomei,** *Clarke*; leaves elliptic acuminate at both ends puberulous on the nerves beneath, racemes solitary simple linear minutely pubescent, corolla $\frac{1}{8}$–$\frac{1}{6}$ in. funnel-shaped.

TENASSERIM; Mt. Mooleeyit, *Beddome.*

Stems densely pubescent. *Leaves* $4\frac{1}{4}$ by $1\frac{1}{2}$ in., membranous, whitened underneath;

petiole $1\frac{1}{4}$ in., pubescent; the uppermost leaf sometimes short-petioled, rounded at the base. *Peduncle* $\frac{1}{2}$ in.; raceme 4–5 in.; bract near the base of the pedicel $\frac{1}{10}$ in., linear-lanceolate; bracteoles $\frac{1}{12}$ in., linear-lanceolate, minutely pubescent. *Calyx-segments* 5, unequal, $\frac{1}{12}$–$\frac{1}{8}$ in., linear-lanceolate, minutely pubescent. *Corolla* funnel-shaped, tube very short. *Filaments* glabrous; anther-cells ovoid, irregularly subdivaricate.—Allied to *E. coriacea*, T. Anders.

V. **OPHIORRHIZIPHYLLON,** *Kurz.*

An erect herb. *Leaves* opposite, petioled, elliptic, entire. *Spikes* very long, many-fld.; bracts narrowly oblong, exceeding the calyx; bracteoles small. *Sepals* 5, subequal, narrowly lanceolate. *Corolla* shortly tubular, curved at the mouth; lobes 5, elliptic, suberect. *Stamens* 2; filaments long, exsert, glabrous; anther-cells 2, oblong, muticous, separate, approximate, erect. *Disc* inconspicuous. *Ovary* glabrous; style long, glabrous, shortly 2-lobed; ovules very many. *Capsule* oblong and seeds as of *Ebermaiera.*

O. macrobotryum, *Kurz in Journ. As. Soc.* 1871, pt. ii. 76.

MARTABAN; Thoungyen, *Brandis.* KAREN HILLS; *Kurz.*

Stem 6–10 in., undivided, pubescent upwards. *Leaves* 6 by $2\frac{1}{2}$ in., cuneate, subacute at each end, glabrous, or pubescent on the nerves beneath; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. *Peduncles* 1–3, subterminal, 1–3 in.; spikes 3–7 in.; bracts $\frac{1}{4}$ in., glabrescent; bracteoles $\frac{1}{8}$ in., linear. *Sepals* $\frac{1}{6}$–$\frac{1}{3}$ in., pubescent. *Corolla* $\frac{1}{4}$ in., white or pale rose, minutely pubescent without. *Stamens* inserted in a ring of hairs, 2 small staminodes added. *Capsule* $\frac{1}{2}$ in.

VI. **CARDANTHERA,** *Ham.*

Herbs, often viscid, aromatic. *Leaves* opposite, upper toothed rarely entire, lower often pinnatifid or in water pectinate. *Flowers* spiked or whorled, or 1–3 together in opposite axils; bract or bracteoles often suppressed. *Sepals* narrow, often unequal. *Corolla* nearly straight, tube shorter than the calyx; limb long, 2-lipped, twisted to the left in bud; palate transversely plicate-rugose, purple-rose and white. *Stamens* 4, didynamous; anthers of the posterior often smaller; anther-cells parallel. *Ovary* narrow; style sparsely hairy. *Capsule* sessile, narrow, 40–100-seeded, bearing seeds from the very base. *Seeds* small, ovoid, somewhat compressed, glandular-puberulous or glabrous; retinacula minute, conical, soft, not curved.—Species 10, Indian and Tropical African.

C. Thwaitesii has solitary flowers, a plane palate, 2 stamens, and stronger retinacula.

Subgenus 1. **Eucardanthera.** *Stamens* 4, fertile. *Flowers* mostly in opposite axils.

* *Spikes terminal, bracts 4-ranked imbricated in fruit.*

1. **C. uliginosa,** *Ham. mss.*; *Benth. in Gen. Pl.* ii. 1074; stem pubescent upwards, leaves subsessile oblong or subovate entire or crenate, bracts round ovate. Ruellia uliginosa, *Linn. f. Suppl.* 290; *Roth Nov. Sp.* 306, *obs.*; *Roxb. Fl. Ind.* iii. 52; *Wall. Cat.* 2378, *chiefly.* Adenosma uliginosa, *Nees in Br. Verm. Schrift.* iii. 298, and in *Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 69 (*excl. syn.* Ruellia ringens); *T. Anders. in Journ. Linn. Soc.* ix. 455.

In drying-up rice-swamps, S. MADRAS; frequent. CEYLON; *Walker.* SIKKIM TERRAI; *Herb. Griffith.*

Annual, 1–1½ ft., erect or decumbent, branching from the base. *Leaves* 1 by ⅓ in., glabrous or subpubescent. *Spikes* 1–3 in., scarcely interrupted at the base even in fruit; bracts ¼ in., from elliptic to cordate, glabrous or puberulous; bracteoles ⅕ in., obovate or elliptic. *Sepals* ⅕ in., linear, pubescent. *Corolla* ⅓ in., puberulous. *Anthers* of the posterior stamens half as large as of the anterior. *Capsule* ⅕ in., minutely pilose upwards.—Much confused by the older botanists with the universal *Hygrophila polysperma*, to which I suspect Miquel's Javanese *C. uliginosa* should be referred.

†† *Whorls or spikes axillary; fruiting interrupted at the base.*

2. **C. Griffithii,** *Benth. in Gen. Pl.* ii. 1074; leaves spathulate oblong or elliptic crenulate pubescent, spikes terminal interrupted at the base in fruit, corolla ¼ in. Adenosma Griffithii, *T. Anders. in Journ. Linn. Soc.* xi. 454.

UPPER ASSAM; Suddiya, *Griffith* (Kew Distrib. n. 6087).—DISTRIB. N. Burma.

Annual, decumbent, rooting; branches 1 foot, pubescent. *Leaves* 1¾ by ⅔ in., subpetioled, obtuse; on the barren shoots smaller, broader. *Spikes* 1–4 in., pubescent, axillary and forming terminal panicles; lower bracts distant (at least in fruit), leaf-like, often containing 2–3 flowers; proper bract ¼ by ⅙ in., elliptic; bracteoles ⅕ in., narrowly oblong. *Sepals* linear-lanceolate. *Corolla* purple, puberulous. *Anthers* of the posterior stamens smaller than those of the anterior. *Ovary* nearly glabrous, a few gland-tipped hairs about its apex. *Capsule* ¼ in.

3. **C. balsamica,** *Benth. in Gen. Pl.* ii. 1074; branches glabrous upwards, leaves petioled oblong crenate, flowers mostly in axillary whorls, sepals longer than the bracts linear-lanceolate one larger than the others. Ruellia balsamica, *Linn. f. Suppl.* 289. Adenosma balsamea, *Spreng. Syst.* ii. 829; *Wall. Cat.* 9082; *Wight Ic.* t. 446; *Nees in DC. Prodr.* xi. 68; *T. Anders. in Journ. Linn. Soc.* ix. 454.

S, DECCAN PENINSULA and CEYLON; in rice-swamps, frequent.

Annual, decumbent or erect, branches 6–15 in.; glabrous, or the inflorescence puberulous; lineolate with raphides. *Leaves* 2 by ⅔ in., obtuse, base attenuate; petiole ¼ in.; lower leaves sometimes pectinate or pinnatifid. *Whorls* usually numerous, distinct; flowers 1–5-nate; bract ⅛–⅙ in., obovate or elliptic; bracteoles similar, but smaller, in crowded whorls, often suppressed. *Sepals* ⅕ in., not widened upwards. *Corolla* ⅓ in., nearly glabrous. *Anthers* of the posterior stamens smaller than the anterior. *Capsule* nearly ⅓ in., puberulous upwards.

VAR. *Thymus*; leaves ⅓ in., corolla ¼ in., capsule scarcely ¼ in. Adenosma Thymus, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 69, *excl. syn.*; *T. Anders. in Journ. Linn. Soc.* ix. 454. Ruellia cernua, *Heyne*; *Wall. Cat.* 2380 (part of letter B only), *not of Roxb.*—Deccan Peninsula, *Heyne.* Nees and T. Anderson place this next *C. triflora*, Ham., from which Nees carefully distinguishes it; the example is almost certainly a starved specimen of *C. balsamica.*

4. **C. verticillata,** *Benth. in. Gen. Pl.* ii. 1074; branches pubescent upwards, leaves often petioled oblong or elliptic crenate, flowers mostly in axillary whorls, sepals longer than the bracts linear-spathulate. Ruellia verticillata, *Wall. Cat.* 2409. Adenosma verticillata, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 69; *Wight Ic.* t. 1524; *T. Anders. in Journ. Linn. Soc.* ix. 454.

DECCAN PENINSULA; Carnatic, *Heyne, Wight*; Concan, *Stocks*, &c. CEYLON; *Thwaites.*

Leaves often somewhat pubescent, especially on the midrib beneath. *Inflorescence*

ciliate-pubescent. *Sepals* wider upwards.—Scarcely specifically separable from *C. balsamica.*

5. **C. triflora,** *Ham. mss.*; *Benth. in Gen. Pl.* ii. 1074; pubescent, leaves ovate or round crenate-serrate, flowers mostly in axillary whorls, sepals equalling the bracts linear. Ruellia triflora, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 52. Adenosma triflora, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 68; *Wall. Cat.* 7147; *T. Anders. in Journ. Linn. Soc.* ix. 454.

On the margin of water; BENGAL, very common. ASSAM, PEGU and SINGAPORE.

Annual, decumbent, rooting at the base, 1 foot. Lower *leaves* often pinnatifid, in water large, pectinate, membranous; cauline $\frac{1}{2}$–1 in. diam., tip rounded, base cuneate or subpetioled, somewhat closely sharply toothed. *Flowers* 1–3-nate; bracts nearly $\frac{1}{3}$ in., obovate, sometimes toothed; bracteoles $\frac{1}{4}$ in., oblong. *Sepals* hairy, one longer than the others, very acute. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. *Anthers* nearly equal. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., pubescent.

6. **C. avana,** *Benth. in Gen. Pl.* ii. 1074; subhirsute, leaves sessile oblong dentate, base obtuse, spikes elongate interrupted, flowers solitary, sepals exceeding the bracts linear. Pedicularis? avana, *Wall. Cat.* 1007; *Benth. Scroph. Ind.* 52. Synnema avanum, *Benth. in DC. Prodr.* x. 538. Adenosma biplicata, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 68; *Wall. Cat.* 7146; *T. Anders. in Journ. Linn. Soc.* ix. 454.

BURMA; *Wallich, M'Lelland,* &c.—DISTRIB. Ava.

An annual weed, 1 foot, decumbent, rooting in mud, branches erect or procumbent. Lower *leaves* usually pinnatifid; upper 1–1$\frac{1}{2}$ in., obtuse, base often subquadrate, with many patent white hairs. *Spikes* 1–5 in., weak; bract $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly elliptic; bracteoles $\frac{1}{8}$ in., narrowly oblong, obtuse. *Sepals* $\frac{1}{3}$ in. and upwards, white-hirsute. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., pubescent without, purple. *Anthers* nearly equal. *Capsule* $\frac{1}{3}$ in., puberulous.

7. **C. pinnatifida,** *Benth. in Gen. Pl.* ii. 1074; dusky pubescent, leaves petioled oblong or elliptic pinnatifid or crenate, flowers solitary axillary or in lax spikes, sepals linear slightly wider upwards sometimes toothed. Nomaphila pinnatifida, *Dalz. in Hook. Kew Journ.* iii. 38; *Dalz. & Gibs. Bomb. Fl.* 184; *Hook. Ic. Pl.* t. 843. Adenosma pinnatifidum, *T. Anders. in Journ. Linn. Soc.* ix. 455; *Bedd. Ic. Pl. Ind. Or.* t. 246.

W. DECCAN PENINSULA; Concan and Canara, *Dalzell, Beddome,* &c.; Mangalore, *Wight.*

Biennial; branches 1–2 ft. *Leaves* 2–4 in., deeply pinnatifid; lobes numerous, oblique, oblong; or smaller, or $\frac{1}{2}$ in. and crenate on the same plant, cuneate or spathulate, more or less petioled. *Spikes* 1–4 in., terminal, weak, hardly interrupted, many-fld.; or more commonly flowers few, distant, solitary, sometimes on very short axillary branches appearing pedicelled; bracts $\frac{1}{4}$ in., elliptic; bracteoles $\frac{1}{8}$ in., oblong. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ in. *Anthers* subequal; cells parallel, base not divaricate nor cordate. *Capsule* nearly $\frac{1}{3}$ in., glabrous.

Subgenus 2. **Plæsianthera.** *Stamens* 2, fertile. *Flowers* solitary, on alternate axils. *Seeds* densely elastically hairy.

8. **C. Thwaitesii,** *Benth. in Gen. Pl.* ii. 1075; pubescent, leaves spathulate-oblong entire, flowers small subsessile in lax compound cymes. Adenosma Thwaitesii, *T. Anders. in Thwaites Enum.* 224, and in *Journ. Linn. Soc.* ix. 455.

CEYLON; Batticaloa, in the tropical region, *Thwaites.*

Annual, 6–12 in., erect, branched, viscid. *Leaves* 1–$1\frac{1}{2}$ in., obtuse, base much attenuate or petioled. *Flowers* very numerous; cymes dichasial, going off into sympodes; upper branches of the cyme in appearance scorpioid with distant flowers, i. e. at each bifurcation one branch with one flower is suppressed; bracts $\frac{1}{8}$ to $\frac{1}{6}$ in., ovate or elliptic; bracteoles small or 0. *Sepals* $\frac{1}{8}$ in., linear, unequal. *Corolla* $\frac{1}{4}$ in., puberulous; lobes twisted to the left; palate not transversely plicate. *Anthers* subquadrate; posterior stamens reduced to filaments. *Ovary* glabrous, tip glandular-hairy; style sparsely hairy. *Capsule* $\frac{1}{4}$ in., bearing seeds from the base. *Seeds* 40–60, ovoid, slightly compressed, the white fine hairs starting out on all sides when moistened; retinacula conical, slightly curved, scarcely hardened.—Possibly a distinct genus, resembling *Brillantaisia* except that it is the posterior stamens that are imperfect in this.

VII. **HYGROPHILA,** *Br.*

Herbs, (in *H. spinosa*) spinescent. *Leaves* opposite, lanceolate or obovate, entire. *Flowers* sessile, in terminal heads or in axillary whorls; bracts elliptic or lanceolate; bracteoles oblong or lanceolate, shorter than the calyx. *Calyx* tubular, 5-fid (or in *H. spinosa* 4-partite); teeth lanceolate or linear. *Corolla* blueish-purple, nearly glabrous; tube ventricose at the apex; limb deeply 2-lipped, oblong, straight. *Stamens* didynamous, posterior similar to the anterior, or smaller, or rudimentary, filaments glabrous; anthers oblong, cells equal, divaricate or connate at the base. *Ovary* oblong, tip hairy; style long hairy, stigma simple linear. *Capsule* linear or narrowly oblong, bearing seeds from the base, 40–100-seeded, or in *H. spinosa* 2–8-seeded. *Seeds* ovoid, compressed, elastically white-hairy when wetted; retinacula hardened, curved and acute.—Species 18, tropical and subtropical.

Subgenus. **Euhygrophila.** Unarmed. *Calyx* 5-toothed. *Capsule* with 8–100 minute seeds.

* *Spikes terminal.*

1. **H. polysperma,** *T. Anders. in Journ. Linn. Soc.* xi. 456; small, procumbent, leaves oblong or ovate nearly entire glabrous or puberulous, spikes terminal dense oblong or linear, fertile stamens 2. *Boiss. Fl. Orient.* iv. 519. Justicia polysperma, *Roxb. Hort. Beng.* 3, and *Fl. Ind.* i. 119; *Wall. Cat.* 2483. Ruellia uliginosa, *Wall. Cat.* 2378, *partly*. Hemiadelphis polysperma, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 80 (excl. syn. Roth); *Wight Ill.* t. 164 b, fig. 3, and *Ic.* t. 1492; *Griff. Notul.* iv. 135.

Throughout INDIA in wet places, alt. 0–5000 ft., from the Punjab and Bhotan to the S. Deccan and Malacca.—DISTRIB. Cabul.

Annual, 6–18 in., branching and rooting. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., from narrowly oblong to ovate, base spathulate or petioled. *Spikes* 1–5 in., somewhat pubescent; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., broadly elliptic, imbricate; bracteoles $\frac{1}{4}$ in., lanceolate. *Sepals* $\frac{1}{4}$ in., linear, hairy. *Corolla* $\frac{1}{3}$ in., slender, pubescent, pale blue or white. *Anthers* oblong, cells slightly divaricate at the base; posterior stamens reduced to teeth. *Ovary* hairy at the apex. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in.; seeds 20–32.—The examples from Tenasserim and Malacca are larger and more glabrous; the capsules $\frac{1}{2}$ in.

2. **H. Serpyllum,** *T. Anders. in Journ. Linn. Soc.* ix. 456; procumbent, leaves small short-petioled ovate or oblong hairy, spikes ovate or shortly oblong, anthers of the posterior stamens half as long as of the anterior. Ruellia polysperma, *Roth Nov. Sp.* 305. Adenosma polysperma, *Spreng. Syst.* ii. 829. Physichilus Serpyllum, *Nees in Hook. Comp. Bot.*

Mag. ii. 311, and in *DC. Prodr.* xi. 81; *Dalz. & Gibs. Bomb. Fl.* 184; *Wight Ic.* t. 1493.

W. DECCAN PENINSULA, from Malwa (*Edgeworth*) to Mysore; frequent in the Concan.

Rootstock woody; stems 4–16 in., procumbent or creeping. *Leaves* ¼–1 in., from lanceolate to orbicular, entire, minutely strigose and with long lax white hairs, lineolate with raphides, nearly glabrate or minutely closely tomentose beneath; petiole 0–⅛ in., but in some basal leaves ½–1 in. *Spikes* dense, white-strigose; bracts ¼ in., elliptic; bracteoles ¼ in., oblong. *Sepals* ¼ in., linear. *Corolla* ⅓–½ in.; tube ventricose upwards, limb long, deeply 2-lipped. *Style* hairy. *Capsule* ¼ in., 8–10-seeded.—The figure of Wight (Ic. t. 1493) shows the 4 anthers subequal, but this is not the case in his example from which he notes his Icon was taken. The synonym, *Ruellia polysperma,* Roth, has been always supposed to have been *Hygrophila polysperma,* T. Anders.; but as Roth says his plant had didynamous stamens and ovate heads, his description must belong here, whatever his plant was.—The leaves of *H. Serpyllum* vary very much in form and indumentum.

VAR. *Hookeriana;* leaves orbicular obtuse cauline often distinctly petioled.—Physichilus sp. nn. 2, 3, *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks.* Bombay, *Law.* A larger plant; cauline leaves often 1 in. diam., petiole ⅛–¼ in., with minute white bristly hairs, but none of the long white hairs characteristic of *H. Serpyllum* type.

3. **H. Stocksii,** *T. Anders. ms.*; cauline leaves petioled spathulate-elliptic, spikes ovate or shortly oblong, anthers of the posterior stamens ⅙ the length of the anterior.—Physichilus n. 4, *Herb. Ind. Or. H. f. & T.*

CONCAN; *Stocks.*

Branches 18 in., stout; internodes 2–3 in. *Cauline leaves* 2½ by 1 in.; petiole ⅜ in. *Corolla* ½ in. *Anthers* of the posterior stamens minute, but (at least sometimes) they appear to contain a few pollen-grains.—Reduced to a Var. of *H. Serpyllum* by T. Anders. (*in Journ. Linn. Soc.* ix. 456), but subsequently marked by him as a species.

** *Whorls axillary, distinct.*

4. **H. salicifolia,** *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 92; erect, leaves lanceolate glabrous, bracteoles lanceolate acute, calyx in flower divided half-way down lobes linear hispid-ciliate, capsule a little longer than the calyx. *Wight Ic.* t. 1490; *Dalz. & Gibs. Bomb. Fl.* 184. Ruellia salicifolia, *Vahl Symb.* iii. 84; *Roxb. Fl. Ind.* iii. 50; *Wall. Cat.* 2373. R. longifolia, *Roth Nov. Sp.* 306.

Throughout INDIA and CEYLON, very common.

Stems 1–3 ft., nearly glabrous. *Leaves* 2½ by ⅓–⅜ in., narrowed at both ends, lineolate by raphides; petiole 0–¼ in.; bract ¼–⅓ in., ovate or elliptic; bracteoles ⅔ as long as the calyx. *Calyx* ⅓–½ in., divided to the base in fruit. *Corolla* ½–⅔ in., pale purple. *Stamens* 4, fertile; anthers subequal. *Capsule* ½–⅔ in., 20–28-seeded. —The whole of the species of this section are included under the present by T. Anders. (in *Journ. Linn. Soc.* ix. 456), which then has a geographic area extending through S.E. Asia, Malaya, Trop. Australia, Trop. America; but if this view be taken, the name of the species should be *H. angustifolia,* Br. (*Prodr.* 479; *Nees in DC. Prodr.* xi. 91).

VAR. *assurgens;* stem decumbent or geniculate rooting with erect branches, leaves obovate-oblong or elliptic subacute. H. assurgens, *Nees in DC. Prodr.* xi. 90, *excl. syn. and var. β.* H. radicans, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. l. c.* 92. Ruellia radicans, *Wall. Cat.* 2410.—E. Bengal, frequent; *Wallich,* &c. Malacca; *Maingay* (Malaya).

VAR. *dimidiata;* leaves obovate or elliptic glabrous densely lineolate especially on the upper surface, base attenuate. H. dimidiata, *Nees in Wall. Pl. As. Rar.* iii. 81;

Wall. Cat. 7150. H. obovata, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 91 (not of Wight, nor Ruellia obovata, *Roxb.*). H. undulata, *Nees in DC. l. c.* 91, *partly* (not Ruellia undulata, *Vahl*).—Prome; *Wallich.* Mergui; *Griffith.*—Distrib. Java, Borneo. Lateral nerves of the leaves patent, arcuate, prominent, regular. Whorls often dimidiate, but entire often, as in Wallich's type specimen.

5. **H. quadrivalvis,** *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 89; erect, leaves lanceolate or elliptic narrowed at both ends glabrate, bracteoles oblong obtuse, calyx in flower divided ⅓ the way down lobes lanceolate minutely strigillose, capsule much exceeding the calyx. H. obovata, *Wight Ic.* t. 1489; *Nees in Pl. Hohenack.* n. 292. H. undulata, *Nees in DC. Prodr.* xi. 91, *partly.* Ruellia quadrivalvis, *Wall. Cat.* 2374, type sheet. R. undulata, *Vahl Symb.* iii. 82.—*Rheede Hort. Mal.* ii. t. 46.

From BENGAL to CEYLON and MALACCA, common.

Closely resembling *H. salicifolia* except in the points stated. *Leaves* usually larger, in *Ruellia undulata* attaining 4 by 1¾ in., undulate on margin. *Calyx* often gamosepalous long after flowering. *Capsule* frequently ¾ in., stouter than in *H. salicifolia.*—Ruellia barbata, *Vahl Symb.* iii. 83, adduced here by Nees, is stated by Vahl to have biaristate anthers, and his description does not otherwise fit well.

6. **H. phlomoides,** *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 90; erect, leaves subsessile elliptic or oblong hairy, whorls of flowers hirsute often distant, calyx in flower divided half-way down teeth linear hispid. Ruellia phlomoides, *Wall. Cat.* 2376, type sheet. R. hirsuta, *Roxb. Fl. Ind.* iii. 51. Dipteracanthus ciliatus, *Nees in Wall. Cat.* 715.

BENGAL, SIKKIM and ASSAM, near the base of the hills; CACHAR, CHITTAGONG, PEGU.

Stems 2–3 ft., hirsute upwards. *Leaves* often 3-6 in., base narrowed, mostly quite sessile. Whorls of *flowers* dense; bracteoles linear-oblong, as long as the calyx-tube. *Corolla* ¾ in. *Capsule* ½ in., somewhat exceeding the calyx.

VAR. *Roxburghii*; branched or decumbent, leaves obovate often shortly petioled usually small hairy or nearly glabrous, calyx-teeth linear-lanceolate, corolla ½ in. H. obovata, *Griff. Notul.* iv. 134. Ruellia obovata, *Roxb. Fl. Ind.* iii. 51; *Wall. Cat.* 2375, type sheet.—Chittagong, *Roxburgh*; Soonderbunds, *J. D. H.*, &c.; Pegu, *Beddome*; Mergui, *Griffith.*

VAR. *repens*; procumbent, rooting, leaves ½–1½ in. obovate, flowers rather smaller. Silhet; *H. f. & T.*, &c.

7. **H. incana,** *Nees in DC. Prodr.* xi. 91 (excl. syn. Roxb.); erect, innovations closely softly white-hairy, leaves narrowly lanceolate adult densely lineolate on both surfaces, calyx in flower divided more than half-way down, teeth linear softly white-hairy and hispid. Ruellia incana, *Heyne in Herb. Rottler.* R. mollissima, *Klein ms., not of Vahl.*

DECCAN PENINSULA; *Rottler.*

Leaves 4 by ⅝ in., very acute at both ends; petiole hardly any. *Capsule* ½ in., shortly exceeding the calyx.—Very distinct by its soft close white hairiness, to which scattered long white hispid hairs are added. It is altogether remote from *Ruellia obovata,* Roxb. (= *H. phlomoides,* Nees Var.), of which Roxburgh's picture is in Herb. Kew.

Subgenus 2. **Asteracantha.** Spinous. *Calyx* 4-partite. *Seeds* 4–8.

8. **H. spinosa,** *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* vii. 22; stout, erect, hispid, leaves lanceolate, whorls axillary spinose

hispid. H. longifolia, *Kurz in Journ. As. Soc.* 1870, ii. 78. Barleria longifolia, *Linn. Amœn. Acad.* iv. 320; *Wall. Cat.* 2505. B. hexacantha, *Moris in Mem. Acad. Torin.* xxxvi. 200, t. 7. Ruellia longifolia, *Roxb. Fl. Ind.* iii. 50. Asteracantha longifolia, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 247; *Dalz. & Gibs. Bomb. Fl.* 189; *Wight Ic.* t. 449. A. auriculata, *Nees in DC. Prodr.* xi. 248, *with syn.—Rheede Hort. Mal.* ii. t. 45; *Jones in As. Research.* iv. 291.

Throughout INDIA in ditches, abundant; from the Himalaya to CEYLON (not seen from Malay Peninsula).

Stems 2–5 ft., usually fascicled and undivided. *Leaves* 3–7 in., subsessile, acute at both ends, sparsely hispid with long white hairs. Whorls large, dense, with (normally 6) straight stout spines ½–1½ in.; bracts ½–1 in., lanceolate; bracteoles ¼–⅓ in., narrow. *Sepals* ⅓–½ in., lanceolate; upper rather the largest, lower obtuse emarginate or shortly bifid. *Corolla* 1 in., nearly glabrous, pale blue-purple. *Anthers* oblong, subequal. *Capsule* ⅓ in., shorter than the sepals, linear-oblong, 4–8-seeded from the base.

VIII. **NOMAPHILA,** *Blume.*

Erect herbs. *Leaves* petioled, entire. *Cymes* axillary, subsessile; branches unilateral, sympodal upwards; flowers pedicelled; bracts linear, minute; bracteoles 0. *Sepals* 5, linear, one somewhat larger. *Corolla* tubular, ventricose upwards; limb deeply 2-lipped; lobes 5, twisted to the left, edges narrowly overlapping in bud. *Stamens* 4, didynamous, glabrous; anthers 2-celled, lower somewhat smaller; cells oblong, parallel, muticous. *Ovary* oblong; style linear, stigma simple linear. *Capsule* linear, seed-bearing from the base, 8–32-seeded. *Seeds* ellipsoid, reticulate, elastically white-hairy when wetted; retinacula hardened, hooked, but slender.—Species 7, in S.E. Asia, Madagascar, and Trop. Africa.

1. **N. Parishii,** *T. Anders. in Journ. Linn. Soc.* ix. 455; leaves lanceolate pubescent or mature nearly glabrous, cymes and calyx glandular-pubescent, sepals subulate. N. pubescens, *Kurz in Journ. As. Soc.* 1871, pt. ii. 74, *excl. all syn.*

MOULMEIN; *Falconer, Parish.* PEGU; *Kurz, Brandis.* TENASSERIM; *Beddome.*—DISTRIB. Java.

Stem 1–2 ft., pubescent upwards. *Leaves* 3 by ½–¾ in., acute at both ends (larger ovate fide T. Anders.), young minutely softly pubescent, mature glabrate lineolate above, sparsely pubescent or glabrate beneath; petiole ½–1½ in. *Cymes* 1½ in. diam.; bracts ⅛–⅙ in., opposite; pedicel in one axil ⅛–⅙ in., in the other suppressed. *Sepals* ⅓ in., one slightly longer than the others, acute. *Corolla* ⅔–1 in., nearly glabrous. *Ovary* glandular; style patently hairy. *Capsule* ½ in., 32-seeded, pubescent from the base.—Very near to, and doubtfully distinct from the Javan *N. corymbosa* (Blume Bijd. 804; Nees in DC. Prodr. xi. 84). Col. Beddome has collected in Tenasserim two forms, one with the calyx and corolla half as large again as in the other; but no other difference can be found.

2. **N. stricta,** *Nees in DC. Prodr.* xi. 84, *excl. syn.*; leaves broadly lanceolate mature glabrate, cymes nearly glabrous, sepals linear subobtuse glabrate or minutely puberulous, ovary nearly glabrous except at the tip. Ruellia paniculata? *Heyne in Herb. Rottler.*

DECCAN PENINSULA?; *Rottler.*—DISTRIB. Malaya to the Philippines.

This plant is in Rottler's Madras collection at Kew, but it may be doubted (see T. Anders. in Journ. Linn. Soc. ix. 456) whether it was collected wild in India. It closely resembles *N. corymbosa*, Bl., except in the points specified. Nees' synonymy is all wrong: Justicia stricta, *Vahl Symb.* ii. 6, has calyx shorter than the bracts; J. pubescens, *Lamk. Ill.* i. 40, has ovate bracts, and is from Guinea; while J. canescens,

Lamk. Ill. i. 40 (referred here by Nees in DC. Prodr. xi. 722), is an American plant of another genus.

IX. CALOPHANES, *D. Don.*

Perennial herbs. *Leaves* opposite, petioled, entire. *Flowers* in axillary clusters or short cymes; bracts and bracteoles narrow. *Calyx* tubular; teeth 5, subequal, lanceolate or subulate. *Corolla* tubular, mouth obscurely 2-lipped; lobes 5, obtuse, twisted to the left in bud, patent in flower. *Stamens* 4, perfect, didynamous, filaments glabrous or hairy; anthers similar, 2-celled; cells oblong, parallel, base minutely mucronate or spurred. *Ovary* glabrous, shortly stalked; ovules 2 in each cell; style linear, hairy, stigma simple linear. *Capsule* oblong, base for a short space narrowed solid. *Seeds* 4, orbicular, much compressed, densely elastically white-hairy when wetted; retinacula strong, curved.—Species 30, in S.E. Asia, Africa and America.

* *Pedicels hardly any, flowers axillary* 2–8 *together or solitary.*

1. **C. Nagchana,** *Nees in DC. Prodr.* xi. 109; prostrate, glabrous or hoary, leaves spathulate-elliptic or obovate, flowers clustered, bracteoles small linear, calyx-teeth longer than the tube, filaments glabrous, anther-cells mucronate. C. depressa, *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* ix. 459. Ruellia Nagchana, *Ham. in Wall. Cat.* 2396. R. erecta, *Burm. Fl. Ind.* 135, t. 41, fig. 3. R. depressa & cernua, *Wall. Cat.* 2379, 2380, *chiefly*. Dipteracanthus Nagchana, *Nees in Wall. Pl. As. Rar.* iii. 82. Dyschoriste depressa & cernua, *Nees in l. c.* 81, and in *DC. Prodr.* xi. 106.

DECCAN PENINSULA; *Rottler, Dr. Shuter,* &c. BEHAR; Patna, *Ham., J. D. H.* CEYLON; *Thwaites.*

Stems 6–18 in., branched, lineolate, sometimes obscurely scabrid. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., obtuse, base attenuate; petiole 0–$\frac{1}{4}$ in. *Bracts* small, spathulate-elliptic or 0; bracteoles $\frac{1}{8}$ in. *Calyx* lineolate, glabrous or puberulous; tube $\frac{1}{8}$ in., teeth $\frac{1}{4}$ in. *Corolla* scarcely so long as the calyx, puberulous, flesh-coloured or blueish, palate not corrugate. *Filaments* connate near the base; anther-cells very shortly but distinctly mucronate. *Capsule* $\frac{1}{3}$ in.—T. Anderson has not indicated the grounds on which he keeps *C. Nagchana* and *C. depressa* distinct; Nees says *C. Nagchana* differs by having the bracteoles spathulate, which is not the case in his type specimen. In *C. Nagchana,* where the flowers are clustered, the bracts of the upper flowers are much smaller, the bracteoles 0–$\frac{1}{12}$ in., but this is exactly as in *Ruellia cernua,* Wall.

2. **C. littoralis,** *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* ix. 460; shrubby, nearly glabrous, leaves small obovate, flowers solitary or 2–3 together axillary, bracteoles elliptic, calyx-teeth shorter than the tube, filaments glabrous, anther-cells mucronate. Justicia madurensis, *Burm. Fl. Ind.* 9, t. 4, fig. 3. Ruellia littoralis, *Linn. f. Suppl.* 289; *Roth Nov. Sp.* 300; *Wall. Cat.* 2381. Dyschoriste littoralis, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* ix. 106; *Wight Ic.* t. 447.

S. DECCAN PENINSULA; near the sea, *Perottet, Wight,* &c.; and inland at Coimbatore, *Beddome.* CEYLON; N. of the island, *Gardner.*

Stems 1–3 ft., sometimes woody, much branched, or elongate less stiff; innovations lineolate, sometimes hoary. *Leaves* $\frac{1}{2}$ in. diam., obtuse, base cuneate or rounded; petiole 0–$\frac{1}{4}$ in. *Flowers* mostly solitary; bracteoles $\frac{1}{8}$ in. *Calyx* densely lineolate, sometimes hoary; tube $\frac{1}{4}$ in., teeth $\frac{1}{8}$ in. lanceolate. *Corolla* $\frac{3}{4}$ in. and upwards, nearly glabrous, narrowly cylindric below, funnel-shaped upwards. *Stamens, ovary,* and *capsule* nearly as in *C. Nagchana.*

** *Cymes small, flowers pedicelled.*

3. **C. vagans,** *Wight Ic.* t. 1526; leaves ovate or oblong more or less pubescent, calyx-teeth long-linear hairy, filaments hairy, anther-cells with prominent white divaricate spurs at the base. *T. Anders. in Journ. Linn. Soc.* ix. 459, *excl. syn.* Ruellia racemosa, *Heyne in Herb. Rottler, not of Roxb.*

DECCAN PENINSULA, *Rottler*; Kurg, *Wight*; Concan, *Stocks*; Belgaum, *Ritchie*.
Stems 1–2 ft., erect or diffuse, branched; innovations softly pubescent, not lineolate. *Leaves* 1½–2½ in., usually narrowed at both ends, mature pubescent on both surfaces or glabrate except a few hairs on the nerves or margin; petiole ¼ in. *Cymes* 1½ in., or some short 3-fid., softly hairy; bracts ¼ in., oblong; bracteoles ⅛ in., linear. *Calyx-tube* ⅙ in., teeth ⅓–½ in. *Corolla* ¾ in., pubescent, blueish, palate transversely plicate. Spurs of the *anther-cells* much larger than in the preceding species. *Capsule* ⅓ in.

4. **C. Dalzellii,** *T. Anders.*; *Bedd. Ic. Pl. Ind. Or.* t. 248; leaves ovate or oblong pubescent or nearly glabrate, calyx-teeth linear hairy, filaments glabrous or minutely hairy, anther-cells minutely mucronate at base or muticous. C. rigidus, *Dalz. ms.*—Dipteracanthus sp. n. 11, *Herb. Ind. Or. H. f. & T.*

CONCAN, *Dalzell, Stocks*; Poona, *Dalzell, Beddome.*
Closely resembling *C. vagans*, but cymes denser, pedicels rarely exceeding ⅛ in., calyx-teeth broader, sometimes linear-lanceolate, flowers rather larger, sometimes exceeding 1 in., and capsule ⅓–½ in., 4-seeded (entirely of *Calophanes*).—The larger flowers and the stamens are quite as of *Ruellia*; the mucro of the anther-cells is either absolutely wanting or so minute that it requires a microscope to find it. Hence the plant was marked a *Dipteracanthus* by Bentham (not *Dipteracanthus vagans*, as T. Anders. states, which was T. Anderson's own mistake, not Bentham's); but as the ovules appear never more than 4, it must remain in *Calophanes*. It invalidates the genus *Calophanes* as distinguished from *Ruellia*.

X. RUELLIA, *Linn.*

Herbs or undershrubs. *Leaves* opposite, entire. *Flowers* sessile or subsessile, solitary or clustered; bract 0; bracteoles large, exceeding the calyx except in *R. ciliata*. *Calyx* 5-partite or 5-fid; teeth subequal, narrow, acute. *Corolla* tubular-ventricose; limb more or less oblique; lobes subequal, rounded, twisted to the left in bud, patent in flower. *Stamens* 4, didynamous, filaments glabrous, unless near the base; anthers subequal, 2-celled; cells oblong, muticous, glabrous. *Ovary* glabrous; ovules in each cell 3–10; style long-linear, hairy, stigma simple linear (except in *R. macrosiphon*). *Capsule* clavate, base solid, cylindric, ellipsoid, seed-bearing upwards. *Seeds* large, thinly discoid, marginate, much imbricated, densely elastically hairy when wetted; retinacula large, hooked, strong.—Species 150, in all warm regions.

The generic character here given is narrowed to the section *Dipteracanthus* (Genus, Nees), to which section all the Indian species strictly belong. In other sections (Genera of Nees), reunited now with *Ruellia* in the Gen. Pl., the bracts, capsules and seeds recede materially from the characters of *Dipteracanthus*.
Ruellia flagelliformis, Roxb. Fl. Ind. iii. 47, came from the Moluccas.

1. **R. prostrata,** *Lamk. Encycl.* vi. 349; prostrate pubescent upwards, leaves small ovate sparsely hairy or nearly glabrous, bracteoles spathulate-elliptic or petioled ovate foliaceous, corolla 1 in. pale purple caducous.

T. Anders. in Journ. Linn. Soc. ix. 460; *Bedd. Ic. Pl. Ind. Or.* t. 282. R. Wightiana, *Wall. Cat.* 2397. R. repens, *Heyne in Herb. Rottler.* Dipteracanthus prostratus, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 124.

DECCAN PENINSULA, extending North to BEHAR; *J. D. H.*

Stems 6–18 in., much branched, nodes short, glabrous downwards. *Leaves* ¾ in., subobtuse, lineolate by raphides and minutely sparsely pilose; petiole ⅛ in. *Flowers* few together or often solitary; bracteoles ⅓–¾ in., often altogether like the leaves. *Sepals* ¼ in., linear, ciliate. *Corolla* pubescent, ventricose portion of the tube twice the cylindric portion. *Capsule* ¾ in., pubescent, seed-bearing ⅔ its length. *Seeds* 16–20, ⅛ in. diam.

VAR. *dejecta*; diffuse sometimes rambling among bushes with very long nodes, leaves larger often 3 in. frequently acute. Ruellia ringens, *Roxb. Fl. Ind.* iii. 44; *Wall. Cat.* 2403. R. repens, *Wall. Cat.* 2384, *chiefly*. R. deccanensis, *Grah. Cat. Pl. Bomb.* 162. Dipteracanthus dejectus, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 125; *Dalz. & Gibs. Bomb. Fl.* 185, *excl. syn.* D. prostratus, *Griff. Notul.* iv. 135.—Throughout India, from the N. Punjab and Assam to Ceylon, very common (not seen from the Malay Peninsula).—Distrib. E. Africa. This variety passes into *R. prostrata* type by insensible gradations.

2. **R. repens,** *Linn. Mant.* 89 (*not of Burm. nor of Heyne*); stem nearly glabrous, leaves ovate acuminate or lanceolate mature nearly glabrous, bracteoles spathulate elliptic or petioled ovate foliaceous, corolla ¾ in. *Blume Bijd.* 794; *T. Anders. in Journ. Linn. Soc.* ix. 460. Dipteracanthus lanceolatus, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 124.

MALAY PENINSULA; Moulmein, *Parish*; Mergui and Malacca, *Griffith*; Singapore, *Lobb.*—DISTRIB. Throughout Malaya to the Philippines. Siam.

Usually more glabrous with narrower leaves than *R. prostrata*, but can only be clearly separated by the smaller flowers; the capsule rarely exceeds ½ in.

3. **R. patula,** *Jacq. Misc. Bot.* ii. 358, and *Ic. Pl. Rar.* i. t. 119; hoary pubescent, leaves ovate, bracteoles spathulate elliptic or petioled ovate foliaceous, corolla 1–1⅓ in. *Lamk. Ill.* t. 550 (*smaller than nat. size*); *Wall. Cat.* 2385; *Roxb. Fl. Ind.* iii. 45; *T. Anders. in Journ. Linn. Soc.* ix. 460. R. erecta, *Roth Nov. Sp.* 308. Dipteracanthus patulus, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 126; *Wight Ic.* t. 1505; *Oerst. in Vidensk. Meddel. Kjob.* 1854, t. 4, fig. 19–21. D. erectus, *Nees in Wall. Pl. As. Rar.* iii. 82, and *Cat.* 7186. Petalidium patulum, *Dalz. & Gibs. Bomb. Fl.* 185.

DECCAN PENINSULA, extending to Scinde, Rajpootana and Bundelkund (*Edgeworth*). CEYLON, frequent.—DISTRIB. Arabia, Abyssinia, Ava.

Resembling *R. prostrata*, but densely closely pubescent. *Corolla* pubescent, very pale grey purple, the cylindric portion of the tube as long as the ventricose part.

4. **R. longifolia,** *T. Anders. in Journ. Linn. Soc.* ix. 460; hairy, leaves linear-lanceolate, bracts linear-spathulate, calyx-lobes lanceolate scarcely longer than the tube, corolla ⅔ in. *Boiss. Fl. Orient.* iv. 519. Dipteracanthus longifolius, *Stocks in Hook. Kew Journ.* iv. 177.

SCINDE; *Stocks, Dalzell.*—DISTRIB. Beloochistan.

Woody at the base, with many ascending stems 12 in. high; whole plant with glandular viscous white or hoary pubescence. *Leaves* 2 by ⅛ in.; petiole continuous with the attenuate leaf-base. *Flowers* mostly solitary; bracteoles ¾ in. *Calyx* ⅓ in. *Corolla* pubescent, blue. *Capsule* ¾ in., pubescent, nearly as of *R. prostrata.*

5. **R. cernua,** *Roxb. Fl. Ind.* iii. 45; leaves oblong or elliptic acuminate hairy, bracteoles petioled elliptic acute leaf-like, sepals ½ in., corolla 1–1¼ in. *T. Anders. in Journ. Linn. Soc.* ix. 460.

CHOTA NAGPORE; Parasnath, alt. 2000–4500 ft., *Thomson, Anderson, Clarke.*
Rootstock woody; annual stems 6–24 in., hairy upwards. *Leaves* 3½ by 1–1¼ in., much acuminate, with scattered short white hairs on both surfaces; petiole ⅝ in. *Flowers* 1–3 together, axillary and terminal; bracteoles 1 in. *Sepals* exceeding ½ in., linear, hairy. *Corolla* pubescent, white with rose or pink-purple marks, tubular portion equalling the ventricose. *Stamens* of the genus. *Capsule* ¾ in., as of *R. prostrata.*—The plant here described is the Parasnath one, which is a typical Ruellia sect. Dipteracanthus, and which Anderson identifies confidently with Roxburgh's *R. cernua,* of which nothing is known but that the seeds came from Mysore, and Roxburgh's description and picture. In his description Roxburgh says the flowers were small, and his picture shows them ⅝ in. long, so that it must be a striking variety of the Parasnath plant.

6. **R. suffruticosa,** *Roxb. Fl. Ind.* iii. 53; leaves elliptic hairy not acuminate, bracteoles petioled elliptic leaf-like, sepals ¼ in., corolla 1½ in. white. *T. Anders. in Journ. Linn. Soc.* ix. 461. R. repens, *Wall. Cat.* 2384, *letter* F *only.* Dipteracanthus Sibua, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 121.

BENGAL; Dinajpur, *Hamilton*; throughout CHOTA NAGPORE, alt. 1–2000 ft., *Clarke.* UPPER GANGETIC PLAIN; Moradabad, *Thomson.*
Rootstock woody; annual stems sometimes 1–3 in. only (especially after the fires), sometimes 1–2 ft. *Leaves* 4 by 1½ in., obtuse in the typical form, or acute hardly acuminate in Thomson's specimens. *Bracteoles* ¾ in., hardly acute. *Sepals* linear, puberulous or glabrate. *Capsule* ¾–1 in.—Very closely allied to *R. cernua.*

7. **R. Beddomei,** *Clarke*; leaves elliptic acute hairy on both surfaces, bracteoles subpetioled ovate acute leaf-like, sepals ½ in., corolla 3 in. R. cernua, *Anders. in Journ. Linn. Soc.* ix. 460, *partly, not of Roxb.*

CENTRAL INDIA; Jubbulpore, *Beddome.*
This seems nearer *R. suffruticosa* than *R. cernua,* of which T. Anderson reckoned it a form; but it differs from both in the very large corolla, the lobes of which are 1 by ¾ in., roundly elliptic.

8. **R. ciliata,** *Hornem. Hort. Hafn.* ii. 585; pubescent, leaves ovate shortly obtusely acuminate, bracteoles scarcely so long as the calyx-tube, corolla 1½ in. *T. Anders. in Journ. Linn. Soc.* xi. 120. Dipteracanthus ciliatus, *Wall. Cat.* 7151; *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 120. Larysacanthus ciliatus, *Oerst. in Vidensk. Meddel. Kjobenh.* 1854, 123.

BURMA; Prome, *Wallich.*
Stems 2 ft., shortly pubescent upwards. *Leaves* 3½ by 2 in., base shortly cuneate, obscurely sinuate-crenulate; petiole ½–1 in. *Bracteoles* ¼–⅓ in., oblong or spathulate-elliptic. *Calyx-tube* ⅓ in.; teeth ½ in., linear, pubescent. *Corolla* nearly glabrous, cylindric tubular much shorter than the ventricose part. *Filaments* hairy at the base. *Ovules* about 12. *Capsule* not seen.

9. **R. macrosiphon,** *Kurz in Journ. As. Soc.* 1873, pl. ii. 92; hairy, leaves linear-lanceolate or linear, bracteoles linear-lanceolate foliaceous, calyx-segments 2½ in. linear-subulate, corolla 2 in. Ruellia sp., *T. Anders. in Journ. Linn. Soc.* ix. 461.

PEGU; *Beddome.*
Perennial, 2–3 in., woolly with crisped white hairs. *Leaves* 2 in., entire, narrowed at both ends; petiole obscure. *Flowers* sessile, solitary; bracteoles ½ by $\frac{1}{12}$ in., linear-

oblong, white-hirsute. *Sepals* ¼ in., linear-lanceolate, glabrous, densely lineolate. *Corolla* pubescent; tube long-linear, ventricose for ⅓ its length. *Stamens* 4, subequal; anther-cells similar, parallel, minutely white-tailed. *Style* elongate, branches $\frac{1}{20}$ in., subequal. *Capsule* many-seeded.—This recedes from the genus in the subequally bifid style; but the corolla-lobes are twisted in bud, and it must be a *Ruellia* or very near it.

DOUBTFUL SPECIES.

R. ? INVOLUCRATA, *Vahl Symb.* iii. 83; leaves short-petioled lanceolate attenuate at both ends entire glabrous, spikes small ovoid hirsute, bracts ovate attenuate quadrifarious. *Nees in DC. Prodr.* xi. 150.

INDIA (Madras ?); *Koenig.*

General aspect of *Justicia Gendarussa.* *Leaves* 6–8 by 1–¾ in., shining, conspicuously lineolate above. *Spikes* as large as a hazel-nut; bracteoles linear, hairy, shorter than the bracts. *Calyx* as long as the bracts. *Corolla* hairy in the throat. *Anthers* subsagitatte at base. *Style* simple lanceolate branch. *Ovary* "pluri-ovulate." —Described by Nees from Koenig's specimen. The number of the ovules uncertain, and it is impossible to guess the genus.

R. ? GLANDULOSA, *Roth Nov. Sp.* 312; shortly villous, leaves petioled ovate-lanceolate subserrate, racemes axillary short subsecund, bracts minute linear-subulate glandular-villous. *Nees in DC. Prodr.* xi. 153. Ruellia glabra, *Heyne.*

INDIA (Madras ?); *Heyne.*

Stem 4-angled, geniculate. *Leaves* 1 in. or a little longer; petiole ⅙ in. *Racemes* nearly horizontal; peduncle solitary, shorter than the petiole, 5- or 6-fld.; bracts at the apex of the pedicels 2. *Sepals* ⅓ in., equal, linear-subulate, glandular-villous. *Corolla* scarcely longer than the calyx, unequal, pubescent.—The combination of minute bracts with a corolla hardly longer than the calyx has defeated all attempts to ascertain the genus of this plant.

XI. **ECHINACANTHUS,** *Nees.*

Erect herbs or undershrubs. *Leaves* opposite, ovate or oblong, acute, toothed. *Cymes* lax, short, few-fld., or long compound, axillary, upper forming a terminal panicle; pedicels short or 0; bracts small, linear; bracteoles small or 0. *Sepals* 5, long, linear, subequal. *Corolla* tubular-ventricose, nearly straight, widened about the middle; lobes 5, subequal, rounded, twisted to the left in bud. *Stamens* 4, didynamous, included; anthers subsimilar, 2-celled; cells oblong, parallel, base spurred or not. *Ovary* with 6–8 ovules in each cell; style linear, stigma simple linear. *Capsule* oblong-linear, 8–16-seeded nearly from the base; retinacula stout, hooked. *Seeds* compressed, discoid, densely hairy, the hairs starting out on applying water.—Species 5, all Indian.

The character of the genus has been here widened to include plants closely resembling *Echinacanthus* except that the anther-cells are muticous.

* *Anther-cells spurred at the base.*

1. **E. attenuatus,** *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 168; leaves oblong or ovate subdentate, sepals linear viscous-pubescent, corolla 1¼ in. puberulous. *T. Anders. in Journ. Linn. Soc.* ix. 459. Ruellia attenuata, *Wall. Cat.* 2345; *Nees in Wall. Pl. As. Rar.* iii. 83 (*not* Strobilanthes attenuatus, *Nees in DC. Prodr.* xi. 193).

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich;* Tambur River, alt. 2–4000 ft., *J. D. H.* Sikkim, alt. 4000 ft., *Treutler,* &c.

Stems 1–2 ft., pubescent upwards. Lower *leaves* 3½ by 2 in., broadly elliptic;

middle cauline oblong, narrowed to both ends, upper 1¾ by ⅙ in.; mature subsessile, glabrate, lineolate or obscurely pubescent. *Cymes* 1–2 in., viscous-pubescent, forming a quasi-panicle 6–8 in. long; bracts ¼–⅓ in., linear, secund, opposite, one barren, the other stipitate 0–$\frac{1}{12}$ in.; bracteoles 0. *Calyx-tube* ⅛–⅙ in.; lobes ½ in. *Corolla* dark purple with lilac veins, cylindric equalling the ventricose portion. *Filaments* and *anthers* sparsely hairy. *Ovary* glabrous, style hairy. *Capsule* ¾ in., oblong scarcely ventricose; solid cylindric portion scarcely $\frac{1}{16}$ in.—(See 6, *E. Pumilio.*)

2. **E. parviflorus,** *T. Anders. in Journ. Linn. Soc.* ix. 459; leaves ovate acuminate serrate, sepals linear glabrous, corolla 1–1¼ in. glabrous.

KHASIA MTS.; *Griffith, Simons* (fide T. Anderson).

Glabrous, erect, divaricate. *Leaves* 3–6 by 2–3 in., base obliquely rounded; petiole 2–3 in. *Panicles* axillary and compound, terminal 6–10 in. long; flowers opposite, sessile; flowers often secund; bracts ⅓ in., linear; bracteoles minute. *Calyx* divided to the base. *Corolla* straight, thrice as long as the calyx, funnel-shaped portion thrice as long as the cylindric. *Capsule* compressed, 8-seeded; seeds small, compressed.—Not seen; the foregoing abstracted from T. Anderson.

3. **E. Brugmansianus,** *Nees in DC. Prodr.* xi. 168; leaves oblong attenuate at both ends repand sub-crenate hirsute-tomentose.

INDIA? in Vahl's Herbarium (Nees).

Calyx-segments a little shorter and less attenuate than those of *E. attenuatus.*—Not seen; the foregoing copied from Nees.

** *Anther-cells muticous at the base.*

4. **E. Andersoni,** *Clarke*; leaves ovate acuminate mature glabrate, cymes lax large zigzag glabrous, corolla ¾ in.—Echinacanthus sp., *T. Anders. ms.*

SIKKIM HIMALAYA; Darjeeling; Pomong, alt. 3000 ft., *Clarke.* KHASIA MTS.?; *Calcutta Herbarium.*

An undershrub, 3 ft.; young parts (at least sometimes) with dense snow-white wool. *Leaves* 4½ by 2½ in., base rounded, crenate-serrate, raphides obscure; petiole 1½ in. *Cymes* in terminal panicles 12 by 15 in., flowers all solitary, mostly opposite on the ultimate branches; pedicels ⅛ in.; bract at the base of the pedicel ¼ in., linear; bracteoles $\frac{1}{12}$ in., linear. *Calyx* ½ in. and upwards, narrow, glabrous or nearly so; segments long-linear acute, connate at base for ⅛–⅙ in. *Corolla* nearly glabrous, blueish. Anterior *filaments* hairy at their base, sparsely so upwards; posterior filaments glabrous, anthers rather smaller. *Style* glabrous, stigma rather short. *Capsule* exceeding ½ in., narrowly-oblong, 12–16-seeded from the base. *Seeds* discoid; on applying water the hairs start out.—Habit and inflorescence of a sympodal *Strobilanthes*, but the capsule is many-seeded. The inflorescence differs from that of *E. attenuatus* in that, of the 2 flowers in the axils of opposite bracts, one is not usually obsolete.

VAR. *viscosa*; panicle and sepals viscous-pubescent, corolla ½ in. pubescent.—Sikkim, alt. 4000 ft.; Lingcham, *Clarke.*

5. **E. longistylus,** *Clarke*; leaves ovate acuminate mature nearly glabrate, cymes lax large zigzag viscous-pubescent, corolla 1⅓ in.

SIKKIM HIMALAYA, alt. 1–4000 ft.; Punkabari and Kursiong, *Clarke.*

Closely resembling the viscous-pubescent Var. of *E. Andersoni*, but the corolla very much larger. *Style* hairy, thickened upwards, stigma linear-lanceolate (resembling the pistil of *Æchmanthera*. *Seeds* 8–12 to the capsule, the hairs on them starting out when wetted.—The position of this and of *E. Andersoni* is doubtful between *Strobilanthes* and *Echinacanthus.*

6. **E. Pumilio,** *Clarke*; finely glandular-pubescent, leaves small

elliptic crenate or toothed, cymes lax compound zigzag pubescent, corolla ⅜ in.

KHASIA MTS., alt. 4200 ft.; Cherra Coal-hill, *Clarke.*

An undershrub, 6–15 in., very woody, much branched, densely covered on all sides with cymes. *Leaves* 1 by ⅓ in., narrowed at both ends (many ¼–½ in. ovate), blackish; hairs scattered, very fine, often gland-tipped; petiole ½ in. *Cymes* as of *E. Andersoni*; bracts ¼ in., linear; pedicels often ⅛ in.; bracteoles ⅛–⅙ in., linear. *Sepals* ⅓ in., linear, finely glandular-pubescent. *Corolla* light-purple, nearly glabrous. *Filaments* glabrous except near the base, where they are shortly connate; anthers subequal, 2-celled; cells oblong, muticous, connective not excurrent. *Ovary* glabrous; style very sparsely hairy, stigma long narrowly lanceolate; ovules 3 in each cell. *Capsule* not seen.—This may prove to be *E. parviflorus*, T. Anders., but it is not likely that T. Anderson would have put that species in Echinacanthus without remark, had the anther-cells been muticous.

XII. PETALIDIUM, *Nees.*

Minutely hairy undershrubs. *Leaves* ovate or narrowly oblong, entire or toothed. *Flowers* sessile or nearly so, solitary, usually crowded on abbreviated lateral branches; bracts 0; bracteoles large, ovate, reticulate-nerved becoming scarious. *Sepals* subequal, linear-lanceolate. *Corolla-tube* straight, ventricose nearly from the base; lobes rounded, twisted to the left in bud, patent in flower. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, spurred at the base. *Ovary* with 2 ovules in each cell; style long-linear, stigma unequally 2-lobed. *Capsule* clavate, compressed parallel to the septum, 2- or 4-seeded; placentæ dehiscing elastically from the bottom of the capsule, raising the discoid seeds with them.—Species 12, one Indian, the rest African.

The above character is drawn chiefly from the Indian species; the number of African species received since the Gen. Pl., vol. ii., pl. 2, was published, may necessitate widening of the generic character.

P. barlerioides, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 114, excl. syn. Eranthemum barlerioides, *Roxb.*; leaves ovate crenate, bracteoles ¾ in., corolla 1 in. *Bot. Mag.* t. 4053; *Dalz. & Gibs. Bomb. Fl.* 185; *T. Anders. in Journ. Linn. Soc.* ix. 461. Ruellia barlerioides, *Roth Nov. Sp.* 310; *Wall. Cat.* 2389. R. bracteata, *Roxb. Fl. Ind.* iii. 47.

N.W. HIMALAYA and N. DECCAN PENINSULA, alt. 1–3000 ft.; extending from Canara and the Concan to Rajmahl and Rajpootana, frequent; reappearing in the OUDE and KUMAON dry Terai, alt. 1500 ft.

Stems several, 2–3 ft., terete. *Leaves* 2–4 in., acuminate, hoary or dusky puberulous; petiole ⅛–½ in.; leaves on the shortened flower-bearing spurs ½–1 in. *Bracteoles* ovate or elliptic, acute. *Sepals* ⅓ in., linear, puberulous or pubescent. *Corolla* narrow-campanulate, pale-blue or white, yellow-tinged; palate with long deflexed fulvous hairs within. *Filaments* and *anthers* minutely sparsely hairy (all but glabrous). *Ovary* glandular upwards, style shortly hairy. *Capsule* ½ in., usually 2-seeded. *Seeds* shaggy, hairs somewhat elastic when wetted; retinacula (with the placentæ) stout, rigid.—*Eranthemum barlerioides*, Roxb., placed here by Nees (and T. Anderson), is either *Eranthemum Parishii* or very near it, and came from the Andamans.

XIII. PHAYLOPSIS, *Willd.*

Prostrate, perennial herbs. *Leaves* opposite, petioled, ovate, entire or obscurely crenate. *Spikes* terminal, 1-sided, dense; bracts orbicular, closely

imbricate, each usually 3-fld.; bracteoles 0. *Sepals* 5, one ovate, nervose, the others linear like bracts. *Corolla* small; tube slender, cylindric; lobes 5, slightly unequal, rounded, contorted in the bud, patent in flower. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, shortly oblong, base minutely mucronate. *Ovary-cells* 2-ovuled; style long-linear, hairy, stigma simple linear. *Capsule* clavate, compressed parallel to the septum, 4-seeded; placentæ dehiscing elastically from the base of the capsule, raising the seeds with them. *Seeds* compressed, discoid, densely elastically white-hairy when wetted.—Species 10, all Tropical and African, one Indian and one Arabian.

P. parviflora, *Willd. Sp. Pl.* iii. 342; hairy, leaves opposite unequal ovate, bracts orbicular or reniform membranous becoming in fruit whitened nervose. *T. Anders. in Journ. Linn. Soc.* ix. 461. Micranthus oppositifolius, *Wendl. Obs.* 39. Ruellia imbricata, *Vahl Symb.* ii. 73; *Roxb. Fl. Ind.* iii. 48; *Wall. Cat.* 2353. R. dorsiflora, *Retz. Obs.* vi. 31. Ætheilema reniforme, *Nees in Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 261; *Wight Ic.* t. 1533; *Dalz. & Gibs. Bomb. Fl.* 192. Æ. parviflorum, *Spreng. Syst.* ii. 826. Æ. mucronata?, *Griff. Notul.* iv. 137.—Ætheilema, *Griff. Notul.* iv. 136.

Throughout INDIA (except the N.W.), alt. 0–3000 ft., from the Himalaya to CEYLON and Tenasserim; common in Bengal both in the plains and in the lower hills.—DISTRIB. Madagascar, Tropical Africa.

A prostrate, closely-branched herb; branches often flagellate, 2–3 ft. *Leaves* 3½ by 1½ in., acuminate at both ends, obscurely pubescent, petiole ½ by 1¼ in.; leaves of lateral branches ½–1½ in. *Spikes* ¾–2 in., densely or thinly hairy; bracts ¼–⅓ in. *Calyx* ¼ in., hairy. *Corolla* ⅓ in., nearly white. *Stamens* glabrous. *Capsule* ¼ in.; valves with rigid backs and scarious sides. *Seeds* $\frac{1}{16}$ in. diam.

XIV. DÆDALACANTHUS, *T. Anders.*

Shrubs or perennial herbs. *Leaves* opposite, petioled, entire or obscurely toothed, lineolate by raphides. *Spikes* linear with distant flowers, or dense or capitate; bracts usually large; bracteoles linear-lanceolate, hardly so long as the calyx. *Corolla-tube* linear, long, widened only near the top or in a few species from the middle; lobes obovate, twisted to the left in bud, horizontal in flower, blue, rarely rose, veined. *Stamens* 2, glabrous; anthers narrowly oblong, 2-celled, muticous, exserted or subincluded. *Ovary* glabrous, 4-ovuled; style long, sparingly hairy, stigma simple linear. *Capsule* clavate, base solid cylindric. *Seeds* normally 4, compressed, discoid, densely finely elastically hairy when wetted.—Species 17, Indian and Malayan.

This genus, in the long corolla and 2 stamens with muticous anthers, greatly simulates Eranthemum; the species are in general easily distinguished by the bracts much exceeding the calyx; in *D. microstachyus & concanensis*, however, the bracts are small, and they can only be recognized by their twisted corolla-lobes.

* *Corolla lower half cylindric, upper half ventricose or funnel-shaped.*

1. **D. tubiflorus,** *T. Anders. in Journ. Linn. Soc.* ix. 485; leaves elliptic acuminate at both ends glabrate, spikes axillary simple dense, corolla 1¾ in. upper half ventricose.

E. BENGAL (? Mishmee); *Griffith* (Kew Distrib. n. 6122).

Stem upwards and innovations pubescent. *Leaves* 8½ by 3 in., obscurely crenulate, lineolate with raphides on both surfaces; nerves 12 pair; petiole 1 in. *Spikes*

3 in., short-peduncled; bracts ⅝ in., closely imbricate, 1-fld., obovate, shortly acute, glabrous, white with green reticulating nerves; bracteoles ¼ in., lanceolate, acuminate. *Calyx* nearly ⅓ in., divided ⅔ the way to the base; lobes lanceolate, acuminate, puberulous. *Corolla* slightly curved, glabrate; lobes ⅓ by ⅓ in., roundly elliptic, nervose. *Stamens* glabrous; anthers exserted. *Capsule* not seen.

2. **D. Griffithii,** *T. Anders. in Journ. Linn. Soc.* ix. 486; leaves oblong or elliptic acuminate at both ends glabrate, spikes long-peduncled simple dense, corolla 1¼ in. upper half funnel-shaped.—Eranthemum sp., *Griff. Itin. Notes*, 96, n. 1437.

BHOTAN; Ghoorgong, *Griffith* (Kew Distrib. n. 6126).

Branchlets upwards tetragonous, obscurely pubescent. *Leaves* 6 by 2 in., lineolate with raphides on both surfaces; nerves 9 pair; petiole ¾ in. *Peduncles* 3–4 in., 4-angled; spikes 2–5 in.; bracts 1 in., densely imbricated, 1-fld., ovate, acuminate, glabrous, whiteish with green reticulating nerves; bracteoles ¼ in., linear-lanceolate. *Calyx* ¼–⅓ in., divided more than half-way down; lobes linear-lanceolate, minutely puberulous. *Corolla* slightly curved, flesh-coloured without, rose within (Griffith), nearly glabrous, narrower at the summit and less suddenly narrowed in the middle than that of *D. tubiflorus*. *Stamens* glabrous; anthers exserted. *Capsule* ½ in., glabrous. *Seeds* ⅛–⅙ in.—Seems very near *D. tubiflorus*.

3. **D. splendens,** *T. Anders. in Journ. Linn. Soc.* ix. 486; leaves ovate or elliptic acuminate at both ends somewhat pubescent, spikes short-peduncled usually very long, corolla 1½ in. pubescent upper half of the tube funnel-shaped.—Eranthemum sp. n. 23, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA; alt. 1–3000 ft., frequent; *Griffith* (Kew Distrib. n. 6129), *J. D. H.*, &c.

Stems 3–5 ft., pubescent upwards. *Leaves* 6 by 3 in., subentire, lineolate with raphides on both surfaces; nerves 12 pair; petiole ½–1½ in. *Peduncles* ½–1½ in.; spikes 3–12 in.; bracts ¾ in., all imbricate, 1-fld., obovate, glandular-pubescent, whiteish or brownish with reticulated green nerves; bracteoles ¼ in., linear-lanceolate. *Calyx* ⅓ in., lobed half-way down; lobes narrow-lanceolate, puberulous. *Corolla* slightly curved, brick-red; lobes ⅓ in., roundly elliptic, patent or recurved in flower. *Stamens* glabrous, anthers exserted. *Capsule* ¾ in., thinly glandular-pubescent.—Near *D. tubiflorus*.

*** Corolla-tube cylindric, widened below the summit for scarce ⅓ its length.*

4. **D. nervosus,** *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves ovate acuminate glabrous lineolate, base shortly attenuate, spikes short uninterrupted, bracts elliptic subobtuse or shortly acuminate nervose glabrate margins entire incurved not ciliate, corolla 1¼ in. blue glabrous. Justicia nervosa, *Vahl Enum.* i. 164; *Bot. Mag.* t. 1358. Ruellia varians, *Vent. Jard. Cels.* t. 46. Eranthemum nervosum, *Br. Prodr.* 477; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 445; *Wall. Cat.* 2493, *in chief.* E. pulchellum, *Andr. Bot. Repos.* t. 88, *not of Roxb.* E. Edgeworthianum, *Nees in DC. Prodr.* xi. 446.

Base of the HIMALAYA, alt. 1–3000 ft., from the Punjab to Bhotan, frequent. SILHET; *Wallich.* SOONDERBUND; *Clarke.*—(Cultivated in various tropical countries.)

Stems 2–6 ft., glabrous, or very nearly so to the summit. *Leaves* often 8 by 4 in., entire or obscurely crenulate, upper shortly attenuate at the base, raphides copious on both surfaces; nerves 10 pair; petiole ½–1½ in. *Spikes* 1–3 in., often ternate, forming close terminal panicles; peduncles ½–1½ in., often acutely quadrangular, lineolate, glabrous or obscurely pubescent; bracts ⅓ in., much more concave than in the neighbouring species, imbricated deeply but somewhat laxly, sometimes obtuse never

long-acuminate, lineolate, puberulous; bracteoles $\frac{1}{3}$ in., narrowly lanceolate. *Calyx* $\frac{1}{4}$ in., lobed half-way down, whiteish, minutely but densely pubescent; lobes lanceolate. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., broadly elliptic. *Stamens* glabrous; anthers exserted, narrowly oblong. *Ovary* glabrous; style nearly glabrous. *Capsule* $\frac{1}{2}$ in.; solid cylindric base short. *Seeds* $\frac{1}{6}$ in. diam.—The Soonderbund plant has the calyx-lobes unusually short. The Var. *scabra* of Nees is merely a specimen in young flower, and therefore slightly scabrid-puberulous (it is not Anderson's *scabra*).

5. **D. macrophyllus,** *T. Anders. in Journ. Linn. Soc.* ix. 487; stem pubescent upwards, leaves elliptic-lanceolate ovate acuminate attenuate at the base often obscurely scabrid-puberulous, spikes linear subinterrupted, bracts elliptic subobtuse nervose margins entire obscurely pubescent not ciliate, corolla $1\frac{1}{4}$ in. *Bot. Mag.* t. 6686. Eranthemum macrophyllum, *Wall. Cat.* 7179; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 446.

PEGU, BURMA and TENASSERIM; *Wallich*, &c. (Kew Distrib. n. 6128).

Closely allied to *D. nervosus*, but the inflorescence more lax. *Leaves* similar to (not larger than) those of *D. nervosus*, but (even when mature) often with scattered minute hairs on the upper surface, and a scabrid pubescence on the nerves beneath; raphides fewer and less prominent. *Peduncles* 2–5 in., pubescent; spikes 2–5 in.; bracts as of *D. nervosus*, the lower often scarcely overlapping.—A single specimen of this from Hort. Kew put into the Herbarium in 1869 is marked *D. scaber* by T. Anderson, but is not the plant so called of his monograph in Journ. Linn. Soc., which is a *D. nervosus*.

6. **D. strictus,** *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves ovate or elliptic narrowed at both ends glabrous or nearly so, spikes linear interrupted forming a large terminal panicle, bracts narrowly elliptic obtuse herbaceous not whitened, corolla $1\frac{1}{4}$–2 in. blue. Eranthemum strictum, *Colebr.*; *Roxb. Fl. Ind. ed. Carey*, and *Wall.* i. 114; *Wall. Cat.* 2494; *Bot. Reg.* t. 867; *Bot. Mag.* t. 3068; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 448 (excl. syn. Wall. Cat. 2492 a.).

EASTERN FRONTIER, in the lower hills, alt. 0–3000 ft., from KHASIA MTS. to CHITTAGONG, *Wallich, H. f. & T.*, &c., frequent.

A herb, 1–3 ft., with large basal leaves, pubescent, sparingly leafy upwards. Basal *leaves* 6–12 in., narrowed at the base, short-petioled, subentire, raphides obscure; upper often 1–2 in. only, base sometimes rounded. *Spikes* 3–8 in., hairy in the Chittagong plants, nearly glabrous in some of the Khasian; bracts $\frac{1}{2}$–1 in., much exceeding the calyx, green, 1-fld.; bracteoles $\frac{1}{4}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ in., divided half-way down; lobes lanceolate. *Corolla* often pubescent. *Stamens* glabrous; anthers included. *Style* hairy in the Chittagong specimens, very slightly so in the Khasian. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., glandular-pubescent, or in the Khasian examples nearly glabrous.

7. **D. roseus,** *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves elliptic acuminate at both ends glabrous lineolate, spikes linear subinterrupted, bracts obovate with a short recurved mucro glandular-pubescent strongly nerved, corolla 1–$1\frac{1}{2}$ in. rose subglabrous. Justicia rosea, *Vahl Enum.* i. 165. Eranthemum roseum, *Br. Prodr.* 447; *Nees in DC. Prodr.* xi. 447; *Dalz. & Gibs. Bomb. Fl.* 195.

W. and S. DECCAN PENINSULA, from the Bombay Ghats to Mangalore, frequent; *Wight, Hohenacker*, &c.

Resembling *D. nervosus*, but inflorescence more lax and bracts different. *Peduncles* 0–2 in., axillary and terminal; spikes often 6 in. *Bracts* (all but the lowest) imbricated, $\frac{1}{2}$–$\frac{3}{4}$ in., strongly rugose by raised inarching green nerves; margins entire, glabrous, ciliate or very hairy. *Seeds* $\frac{1}{8}$ in. diam., much compressed. Otherwise (except the colour of corolla) as *D. nervosus*.

VAR. *Neesii*; leaves ovate acuminate not lineolate, nerves much raised beneath scabrous, spikes short dense, bracts ciliate.—ASSAM ?

8. **D. tetragonus,** *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves lanceolate acuminate at both ends glabrous densely lineolate, spikes solitary short-peduncled oblong very dense, bracts elliptic green long-ciliate, corolla 1½ in. pale blue. Eranthemum tetragonum, *Wall. Cat.* 7180; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 447.

BRITISH BURMA, *Wallich*; Moulmein, *Parish*; Thoungyen Hills, *Beddome*; Beeling Forest, *Brandis*.

Branches upwards slender, quadrangular, nearly glabrous. *Leaves* 7½ by 1¼ in., much attenuate, subentire; nerves 7–8 pair; petiole 1 in. *Spikes* 2 in., hairy; bracts ⅜ by ⅕ in., subobtuse. *Calyx* and *bracteoles* as of *D. nervosus*. *Corolla-tube* glabrous; mouth ¾–1 in. *Anthers* not exserted. *Capsule* ⅓ in.; solid narrowed base scarcely ⅛ in.—Not nearly allied to *Eranthemum salaccense* (Blume Bijd. 792), as T. Anderson supposed; Kurz erroneously reduced it thereto in Journ. As. Soc. 1870, pt. ii. p. 78.

9. **D. suffruticosus,** *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves elliptic narrowed at both ends glabrate not lineolate, spikes short dense nearly glabrous, bracts obovate nervose not whitened, corolla 1¼ in. pale blue. Eranthemum suffruticosum, *Roxb. Fl. Ind.* i. 111; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 448. E. barlerioides, *Roxb. Fl. Ind.* i. 113. E. amœnum, *Ham. ms.*

ANDAMANS; *Herb. Hamilton, Kurz.*

Nearly glabrous; branches leafy, obscurely tetragonous. *Leaves* 6 by 2¼ in., undulate; nerves 6 pair; petiole ⅜ in. *Spikes* 1–1½ in., terminal, solitary, dense with (in Roxburgh's drawing) sometimes a few straggling flowers at the base; bracts ⅜ in., obtuse with a short mucro, glabrous; nerves prominent beneath; bracteoles ¼ in., linear-lanceolate. *Calyx* ¼ in., divided half-way down; lobes linear-lanceolate. *Corolla-tube* glabrous; mouth ¾ in. diam. *Anthers* included.—*E. barlericides*, somewhat doubtfully referred here by T. Anderson, is merely one of the cases where Roxburgh changed the name of a species, and his editors Wallich and Carey printed the description twice over.

10. **D. microstachyus,** *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves elliptic narrowed at both ends glabrate, flowers remote sessile panicled, bracts small none imbricate, corolla 1½ in. purple.

MOULMEIN; *Lobb.*

A herb, 2–3 ft., with large basal leaves, sparingly leafy upwards, habit of *D. strictus*. *Leaves* 8 by 3 in., base attenuate or rounded, subentire, obscurely or not lineolate; nerves 10 pair; petiole 0–1 in. *Panicle* large, compound, trichotomous, glandular-pubescent, branches quadrangular; bracts ⅙ in., ovate or elliptic; bracteoles ⅙ in., oblong. *Calyx* ⅓ in., deeply divided, green; lobes linear, viscid-pubescent. *Corolla-mouth* 1¼ in. diam. *Anthers* included. *Ovary* and *style* somewhat glandular-pubescent. *Capsule* ¾ in., acute; solid cylindric base longer than the seed-bearing part.—Though the shortened bracts give this so different an aspect, the species appears very closely allied to *D. strictus*.

11. **D. purpurascens,** *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves ovate acuminate upper often rounded at the base, spikes solitary oblong very dense, bracts ovate much acuminate nervose ciliate. Justicia pulchella, *Roxb. Cor. Pl.* ii. 41, t. 177. Eranthemum pulchellum, *Roxb. Fl. Ind.* i. 111, *not of Andr.* E. purpurascens, *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 447. E. montanum, *Wall. Cat.* 2492, *partly*. E.

nervosum, *Dalz. & Gibs. Bomb. Fl.* 195, *not of others.*—Eranthemum sp. n. 12, *Herb. Ind. Or. H. f. & T.*

CENTRAL INDIA, alt. 1–4000 ft., common; from the Bombay Ghats, *Jacquemont*, and Belgaum, *Ritchie*, to Parasnath and South Behar, *J. D. H.* UPPER ASSAM; Dibroo-mook, *Griffith*.

Stems 2–4 ft., leafy. *Leaves* attaining 9 by 4 in., base decurrent, uppermost much smaller, subsessile, often cordate, subentire, sometimes glabrate, densely lineolate, sometimes pubescent on the nerves on both surfaces (the raphides in such case obscure); nerves 7–9 pair. *Spikes* 1–2½ in., usually appearing long-peduncled, the uppermost leaves being much reduced; bracts 1 in., base rounded, rigid, green not whitened but with much elevated nerves, apex divaricate, margins not incurved; bracteoles ⅛ in., linear-lanceolate. *Calyx* ¼ in., lobed half-way down; segments lanceolate, whitened, minutely pubescent. *Corolla* 1½ in., blueish, pubescent or nearly glabrous. *Anthers* included. *Capsule* ½–⅝ in., lower solid cylindric portion short.—The bracts in Roxb. Cor. Pl. t. 177 are characteristically those of *D. purpurascens*, and in the description he says bracts ciliate. Moreover Roxburgh got his *E. pulchellum* from "the drier parts of India."

12. **D. montanus,** *T. Anders. in Thwaites Enum.* 229, and in *Journ. Linn. Soc.* ix. 489; leaves elliptic attenuate at both ends subglabrous lineolate, spikes linear or capitate viscidly hairy, bracts lanceolate linear-acuminate green, calyx deeply divided segments linear green glandular hairy, corolla 1¾ in. blue. Eranthemum capense, *Linn. Amœn. Acad.* i. 385. E. montanum, *Roxb. Fl. Ind.* i. 110; *Wall. Cat.* 2492; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 448 (excl. syn. Bot. Mag. t. 4031); *Wight Ic.* t. 466; *Dalz. & Gibs. Bomb. Fl.* 195. E. fastigiatum, *Spreng. Syst.* i. 89. Justicia fastigiata, *Lamk. Ill.* i. 41. J. montana, *Roxb. Cor. Pl.* ii. 41, t. 176.

W. and S. DECCAN and CEYLON, alt. 1–6000 ft., frequent; *Wallich, Wight*, &c.

Herb 2–3 ft., leafy; upper branches or peduncles quadrangular, usually white-hairy or glandular. *Leaves* 4½ by 1¾ in., all (except the floral) gradually attenuate at the base; nerves 6–7 pair; petiole ½–1½ in. *Inflorescence* extremely variable; from linear elongate spikes in compound corymbs or panicles with distant flowers to distant short-oblong very dense heads, always more or less glandular-hairy; bracts from elliptic with linear tips to linear-lanceolate, apex subobtuse, viscid-pubescent not whitened, lowest often 2-fld., bracts usually narrower in the elongate spikes broader in the shortened; bracteoles ⅓ in. *Calyx* ¼ in. *Corolla* 1½ in., pale blue. *Anthers* subexserted from the corolla-tube. *Capsule* ½–1 in. *Seeds* $\frac{1}{10}$ in. diam.—A variable species best distinguished by the long linear green viscidly hairy calyx-teeth. The high-level form with shortened spikes hardly differs from *D. purpurascens* by any other character than this. The Javan *D. salaccensis* does not much differ but by the bracts being obscurely linear-spathulate upwards.

VAR. *Wightiana*; leaves large ovate, corymb very compound with linear branches, bracts linear, calyx and capsule small. Eranthemum Wightianum, *Wall. Cat.* 2495, *letter* A *only*; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 449.—Deccan Peninsula ?, *Russell.*—This is a remarkable specimen, estimated a species by Nees; it seems that T. Anderson never saw it; the remainder of *Wall. Cat.* 2495 with distant capitate heads being that which T. Anders. reduced to a Var. of *D. montana.* In Russell's plant the leaves are 7 by 3½ in., shortly suddenly attenuate at the base, the uppermost subcordate; the bracts are exactly linear, parallel-sided (in *D. montanus* they are always dilated downwards); the corolla is not fully expanded, but seems smaller than in *D. montanus.*

VAR. *concanensis*, T. Anders. ms.; panicle compound, spikes linear interrupted, bracts ovate abbreviated, not rarely 2-fld.—Concan; *Law.*

13. **D. Parishii,** *T. Anders. in Journ. Linn. Soc.* ix. 489; leaves ovate or elliptic acuminate at both ends undulate-crenate glabrous, spikes sub-

capitate or oblong dense, bracts leaf-like glabrous often undulate-crenate, corolla 1½ in. blue.

MALAY PENINSULA; Tenasserim, *Helfer* (Kew Distrib. n. 6176), *Beddome*; Tavoy and Moulmein, *Parish*.

Whole plant lineolate with raphides. *Stems* erect, elongate, tetragonous, leafy upwards. *Leaves* 5½ by 2½ in., tip long acuminate, base shortly acuminate; nerves 7–8 pair; petiole 0–1½ in. *Flowers* often appearing densely clustered at the nodes on shortened axillary spurs; bracts 1–1⅝ in., leafy, imbricated usually densely sometimes laxly; bracteoles ⅓ in., linear-lanceolate. *Calyx* ⅓ in., divided half-way down; lobes narrow-lanceolate, whitened, puberulous. *Corolla-limb* ¾ in. diam. *Anthers* included. *Capsule* 1 in., glabrous.—This much resembles *D. suffruticosus*, but the leaves are conspicuously lineolate. T. Anderson has overlooked the true bracteoles; they are exactly similar in size, form and situation to those of other species. The bracts (bracteoles of T. Anders.) are 1 to each flower; when they are opposite on the spike and the flower in the axil of one is aborted, they appear superficially 2 to each flower; as is the case often in *D. montanus* and several other species and genera.

XV. **HEMIGRAPHIS,** *Nees.*

Herbs or shrubs. *Leaves* opposite, toothed or subentire. *Flowers* sessile, in heads or spikes, rarely solitary; heads terminal or quasi-axillary on shortened branchlets, rarely (in *H. flava*) panicled; bracts imbricated, large, 1-fld.; bracteoles small, narrow, or 0. *Calyx* 5-partite nearly to the base; segments 5, subequal, linear-lanceolate or lanceolate. *Corolla* long-tubular, lower half cylindric, upper funnel-shaped or ventricose; lobes 5, rounded, subequal, sinistrosely contorted, blue or yellow. *Stamens* 4, didynamous, included or nearly so; anthers oblong, 2-celled, muticous, sometimes triangular, bases acute. *Style* long, stigma of one linear and one very short lobe; ovules 3–8 in each cell. *Capsule* linear or linear-oblong, 6–20-seeded nearly from the base. *Seeds* compressed, discoid, brown when dry, apparently glabrous with a white margin, when wetted densely hairy with white long unicellular hairs, each with numerous annular thickenings.—Species 20, Indian, Malayan, a few Chinese and Japanese.

Sect. 1. *Corolla* tubular-ventricose, limb blue. Longer *filaments* glabrous in their upper half or very nearly so.

1. **H. dura,** *T. Anders. in Journ. Linn. Soc.* ix. 461 (*excl. syn.* Ruellia crispa); bristly, leaves spathulate-elliptic crenate, bracteoles 0, calyx ½ in. subscarious. Ruellia urens, *Heyne in Herb. Rottler*; *Roth Nov. Sp.* 302; *Roxb. Ic. Ined.* R. dura, *Nees in DC. Prodr.* xi. 146; *Dalz. & Gibs. Bomb. Fl.* 186.

DECCAN PENINSULA; Kurnool (in Madras), *Beddome*; Bombay, *Jacquemont*; Central India, *Edgeworth*; Belgaum, *Ritchie*; Nilgherries, *Hohenacker*, &c.

Stems 1–2 ft., branched, diffuse, often almost prickly from white deflexed bristles. *Leaves* 1¾ by ⅝ in., obtuse, harshly scabrous; petiole ¼ in. *Heads* many-fld., with white and often much brown hair; bracts ⅝ in., oblong or spathulate. *Calyx* divided nearly to the base; segments linear, green with scarious margins, setulose. *Corolla* ⅝ in., subequal, blueish-purple, ventricose portion about as long as the cylindric. Longer *filaments* laxly hairy below. *Capsule* ½ in., 6–8-seeded.—Nees erroneously maintains (DC. Prodr. xi. 146) that *R. urens* of Heyne, Roth and Roxburgh is the same as their *R. latebrosa*.

2. **H. hirta,** *T. Anders. in Journ. Linn. Soc.* ix. 462; softly hirsute, leaves small ovate crenate, bracteoles 0, calyx ⅓ in. green. Ruellia hirta, *Vahl*

Symb. iii. 84, t. 67; *Roxb. Fl. Ind.* iii. 46; *Nees in DC. Prodr.* xi. 145, *excl. Var. β.* R. latebrosa, *Roxb. Fl. Ind.* iii. 46? ; *Wall. Cat.* 2382, *not of Roth nor of Dalz. nor of Wight.* R. sarmentosa, *Nees in Wall. Pl. As. Rar.* iii. 83.

BENGAL; very common. UPPER GANGETIC PLAIN; Moradabad, *Thomson.*

Hirsute (not harshly) with white hairs. *Stems* 6–18 in., creeping in grass. *Leaves* ½–1 in., obtuse; petiole 0–1/12 in. *Heads* 2–6-fld.; axillary solitary flowers not rarely added; bracts ⅜ in., elliptic. *Sepals* linear, or in fruit subspathulate. *Corolla* ½ in., subequal, pale lavender-blue, fugacious, glabrous with 2 hairy lines in the palate; ventricose portion nearly as long as the cylindric. Longer *filaments* laxly hairy below. *Style* sparsely hairy. *Capsule* ⅓ in., 12-seeded.—It is doubtful whether Roxburgh described this species under two names, or whether one of these applied to *H. venosa* or some other species. Kurz (*Journ. As. Soc.* 1871, ii. 74) proposed (unhappily) to unite this with *Ruellia Blumeana.*

3. **H. venosa,** *Clarke*; scabrid-pubescent, leaves petioled ovate crenate, bracteoles as long as the calyx. Ruellia venosa, *Heyne in Herb. Rottler.* R. crispa, *Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 146, *not of Linn.*

DECCAN PENINSULA; *Rottler, Wight.*

Stems 6–12 in., branched, rooting, sparingly pubescent. *Leaves* 2 by 1 in., acuminate at both ends, crisp, lineolate; petiole ¾ in. *Heads* many-fld., axillary and terminal; bracts ½ in., obovate; bracteoles ⅙ in., lanceolate, densely lineolate, white-hirsute upwards. *Sepals* ⅙ in., 5, subequal, lanceolate, below glabrous scarious, tips hispid with white hairs. *Corolla* ⅔ in., tube for ¼ in. cylindric, for ¼ in. ventricose or almost hemispheric; mouth subequal. *Anthers* subequal, of the longer filaments subexsert. *Ovary* glabrous, tip glandular-pubescent; ovules 6–8, on retinacula. *Capsule* not seen.—Much resembling *Cardanthera triflora*, but the corolla is smaller, not (or obscurely) bilabiate. T. Anderson placed this with his *Stenosiphonium zeylanicum*, which has 4 ovules and a differently shaped corolla, and is *Strobilanthes exsertus* described below.

4. **H. confinis,** *T. Anders. in Journ. Linn. Soc.* ix. 463; thinly softly white-hairy, leaves petioled elliptic narrowed to both ends obsoletely crenate, bracteoles hardly half as long as the calyx. Ruellia confinis, *Nees in DC. Prodr.* xi. 148.

MERGUI and MALACCA; *Griffith, Maingay, Cuming.*—DISTRIB. Java, Borneo (not Philippines).

Stems 2 ft., sparsely hairy. *Leaves* 3½ by 1¼ in., obtuse or obtusely acuminate, raphides plentiful but obscure; petiole ⅓ in. *Spikes* terminal, dense, often elongate (especially in fruit) 2–3 in., oblong, or subglobose when young; bracts ⅓–½ in., ovate, subacute, imbricate, sub-4-seriate, hairy often viscidly; bracteoles ⅛–⅙ in., linear or narrow. *Sepals* ¼–⅓ in., narrowly lanceolate sublinear, one slightly larger. *Corolla* ½ in., with few white hairs within; lower cylindric portion about as long as the suddenly ventricose. *Filaments* glabrous or nearly so; anthers 2-celled, long. *Ovary* and style glabrous. *Capsule* about ¼ in., usually 8-seeded.—Kurz (*Journ. As. Soc.* 1871, pt. ii. 74) reduces this to *Ruellia Blumeana*, Nees, which differs much, by the spikes short not quadrifarious, the filaments bearded, &c.

Sect. 2. *Corolla* narrowly tubular-funnel-shaped, limb blue. Longer *filaments* densely bearded in their upper half by long obtuse white papillose hairs.

5. **H. latebrosa,** *Nees in DC. Prodr.* xi. 723; diffuse, hairy, leaves petioled ovate crenate or serrate, bracteoles 0, capsule less than ⅓ in. 6-seeded. *Wight Ic.* t. 1504. H. elegans, *T. Anders. in Journ. Linn. Soc.* ix. 463, *not of Nees.* H. Pavala, *Kurz in Journ. As. Soc.* 1870, pt. ii. 78.

Ruellia Pavala, *Roxb. Fl. Ind.* iii. 47. R. latebrosa, *Roth Nov. Sp.* 307; *Nees in Wall. Pl. As. Rar.* iii. 83, *not of Roxb.* R. erecta, *Ham.*; *Wall. Cat.* 2395. R. fasciculata, *Wall. Cat.* 2394, *part of* A *sheet only.* Ruellia elegans, *Bot. Mag.* t. 3389; *Dalz. & Gibs. Bomb. Fl.* 186.

Throughout the DECCAN PENINSULA, alt. 0–4000 ft., from S. Behar (*J. D. H.*) to Coorg (*Wight*); common.

Stems 1–2 ft., branching, weak, hairs soft patent white. *Leaves* 2½ by 1–1⅓ in., acuminate at both ends, sparsely hairy, obscurely (or not) lineolate; petiole 1–1⅓ in.; leaves on the secondary flowering branches much smaller. *Bracts* ovate or elliptic, scarcely longer than the calyx, or of the outermost flowers petioled, and greatly exceeding the calyx. *Sepals* ⅙–¼ in., subequal, linear-lanceolate, whitened, hairy not obviously lineolate. *Corolla* ⅔–¾ in., nearly straight; tube pale or yellowish, gradually narrowed upwards, limb blue. Shorter *filaments* glabrous; anthers narrowly oblong, cells triangular acute (not awned). *Capsule* ¼ in., rarely ⅓ in., minutely patently hairy, 6-seeded.—This hardly differs from *H. elegans*, Nees, but by the smaller capsule with 6 (not 8) seeds. T. Anderson considered them one.

VAR. *rupestris*; more pubescent, often viscid aromatic, heads denser. Ruellia diffusa, *Wall. Cat.* 2383, *letters* C, D. R. satpoorensis, *Wawra in Oestr. Bot. Zeit.* 1881, 281, and in *It. Pr. Cob. Bot.* i. 90, t. 8 B.—Deccan Peninsula, Chota Nagpore, Rajpootana. N.W. Himalaya, alt. 2–5000 ft.; Kumaon, *Strachey & Winterbottom*; Sewaliks, *Stewart.*—Even commoner than the type, more rigid, growing in drier places. It was distributed as *Ruellia rupestris* to Wallich and to Roth (see *Roth Nov. Sp.* 307). The authentic sheet named by Heyne in Herb. Rottler consists partly of this, partly of *Lepidagathis fasciculata.*

VAR. *Beddomei*; much less hairy, leaves small ovate serrate or crenate glabrate.—Bellary; *Beddome.*

6. **H. ebracteolata,** *Clarke*; hispid with scattered white hairs, leaves small petioled ovate serrate, bracteoles 0, capsule ⅓ in. 6-seeded. H. rupestris, *T. Anders. in Journ. Linn. Soc.* ix. 462, *partly.* Ruellia ebracteolata, *Dalz. in Hook. Kew Journ.* ii. 342. R. latebrosa, *Dalz. & Gibs. Bomb. Fl.* 186.

BOMBAY GHATS; *Dalzell, Stocks.*

Leaves 1¼ by 1 in. (mostly smaller), obtuse or very shortly acuminated, base obtuse or almost rounded, cuneately decurrent on the petiole, coarsely toothed, hairs stiff (almost bristly) especially on the nerves beneath; raphides plentiful but obscure. Otherwise altogether as *H. latebrosa*, Nees, of which Dalzell finally considered it a form.—*H. rupestris*, T. Anders., is made up of *Ruellia rupestris* and of *R. ebracteolata*, Dalz.; but Dalzell's *R. ebracteolata* is much remoter from *R. rupestris* than is the latter from *Hemigraphis latebrosa*, Nees.

7. **H. flaccida,** *Clarke*; stems long softly patently hairy, leaves petioled ovate or elliptic subentire or obsoletely crenate, heads small few-fld., bracteoles 0. Ruellia flaccida, *Kurz in Journ. As. Soc.* 1873, pt. ii. 91.

PEGU; *Kurz.*

Longer filaments bearded upwards, shorter naked. *Bracts* not fimbriate nor flowers solitary (as Kurz describes). *Capsule* not seen.—As Kurz admitted *H. latebrosa* to be of the genus *Hemigraphis*, he erred in placing this species in *Ruellia*; for it is closely allied to *H. latebrosa.* The white hairs on the stems are ⅛ in. long, very copious, nearly similar to those of *H. latebrosa.* If this is well separable from *H. latebrosa*, it must be by the very entire leaves; in *H. latebrosa* the larger leaves (on the principal stem) are always prominently toothed.

8. **H. elegans,** *Nees in DC. Prodr.* xi. 722, *of T. Anders. partly*; diffuse, patently softly white-hairy, leaves petioled ovate or elliptic crenate-serrate, bracteoles 0, capsule ⅓ in. 8–10-seeded. Ruellia diffusa, *Wall.*

Cat. 2383, *letters* A, B; *Nees in Wall. Pl. As. Rar.* iii. 83. Strobilanthes burmanica, *Kurz in Journ. As. Soc.* 1873, pt. ii. 92.

PEGU; *Wallich, Kurz.*—DISTRIB. Ava.

Similar to, but stouter than, *H. latebrosa*; *leaves* less sharply toothed. Inner *bracts* of the heads ½–¾ in., narrowly elliptic or oblong, overtopping the calyx. *Corolla* ¾ in. and upwards; larger and broader than that of *H. latebrosa. Stamens* as in *H. latebrosa*, or (fide Nees) one anther-cell sometimes rudimentary.—The long inner bracts give this plant a different aspect from the Deccan *H. latebrosa.* Bracteoles 0; Nees says lanceolate longer than the calyx, from which it is probable that he means by bracteole that which he has called bract in the diagnosis of the same species. Kurz's *Strobilanthes burmanica* is more hairy than Wallich's Pegu examples; and it may be doubtful if several of the species here admitted are other than local varieties of *H. latebrosa.*

VAR. *crenata*; viscid-pubescent, less softly white hairy, leaves crenate. Ruellia crenata, *Benth.*; *Hohenack. in Flora* 1849, 558. Malabar; Canara, *Hohenacker*, n. 737; Concan, *Stocks*; Belgaum, *Ritchie*; Bombay, *Law*; Bellary, *Beddome.*

9. **H. Griffithiana,** *T. Anders. in Journ. Linn. Soc.* ix. 463; leaves lanceolate remotely obscurely toothed glabrate, heads terminal shortly cylindric hairy, bracteoles much shorter than the calyx. Ruellia Griffithiana, *Nees in DC. Prodr.* xi. 149.

MERGUI; *Griffith* (Kew Distrib. n. 6091); Tenasserim, *Helfer* (Kew Distrib. n. 6187).

Rootstock perennial; stems several, 1 foot, erect, scarcely branched, slender, pubescent upwards. *Leaves* 2 by ⅓ in., sessile, attenuate to both ends, pubescent when young. *Spikes* ⅓–1 in., viscidly hairy; bracts ¼–½ in., elliptic, subobtuse; bracteoles ⅛–⅙ in., narrow. *Sepals* ¼ in. and upwards, linear-lanceolate, not very unequal. *Corolla* ½ in. and upwards, more ventricose than in others of this section, bearded in the palate within. Longer *filaments* densely bearded upwards with long white hairs, shorter glabrous. *Capsule* rather more than ¼ in., usually 8-seeded. *Seeds* $\frac{1}{16}$ in., much compressed, discoid, densely elastically white-hairy when wetted.

10. **H. quadrifaria,** *T. Anders. in Journ. Linn. Soc.* ix. 463; hirsute, leaves ovate or elliptic acute, bracts large, corolla 1¼ in. Ruellia quadrifaria, *Wall. Cat.* 7152; *Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 147.

MOULMEIN; *Parish*, n. 403. TENASSERIM; *Beddome*, nn. 96, 97.—DISTRIB. Ava.

Hirsute with white or yellowish hairs from tubercular bases. *Branch* stout, shrubby. *Leaves* 4½ by 2½ in., upper narrower, base obtusely rhomboid, crenate-serrate; petiole ⅓ in. *Heads* dense, terminal and peduncled on short axillary branches, hirsute; bracts 1 by ⅓–½ in., inner gradually smaller; bracteoles linear-lanceolate rather shorter than the calyx. *Sepals* ½ in., narrowly lanceolate, bases subconnate. *Corolla* sparingly pubescent, more ventricose than in the other species of this section, "deep blue" (Parish). *Filaments* of the longer stamens densely shaggy with long white hairs to the apex; anthers all subequal, muticous. *Style* simple, hairy; ovules 4–6 in each cell. *Capsule* ½ in., narrowly oblong, slightly hairy upwards, 8–12-seeded nearly from the base.

11. **H. glaucescens,** *Clarke*; leaves oblong narrowed to each end scabrid pubescent on the nerves beneath, spikes dense strobilate, bracts ovate acute hirsute, bracteoles very small lanceolate. Strobilanthes glaucescens, *Nees in Wall. Cat.* 7155, and in *Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 178; *T. Anders. in Journ. Linn. Soc.* ix. 467.

PEGU and TENASSERIM; *Griffith*, &c.

A shrub; branches scabrous. *Leaves* 6 by 2 in., crenulate, lineolate, sparingly

setulose above, more pubescent beneath; nerves 9–10 pair; petiole ¾ in. *Spikes* 1–3 in., ovoid or cylindric, very shortly peduncled, solitary; bracts ¾ in., green, persistent; bracteoles ⅛–⅙ in. *Sepals* ⅓ in., linear-lanceolate, hairy. *Corolla* 1 in. (purple?) straight, subsymmetric, upper half narrowly ventricose. Longer *filaments* densely bearded with long white hairs turned to one side. *Ovary* glandular-hirsute upwards; style sparsely hairy. *Capsule* ⅓ in., pubescent, 6-seeded. *Seeds* 1/12 in., compressed, orbicular, when wet the fine white hairs spring out abundantly on all sides; areoles 0.—Habit and fruit-spikes so exactly those of a typical *Strobilanthes* that neither Nees nor T. Anderson appear to have tried the ovules; they are always 6, and the capsule has 6 seeds on 6 retinacula.

Sect. 3. *Corolla* large, tubular, yellow. Longer *filaments* bearded in their upper half by long obtuse white papillose hairs.

12. **H. flava,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 74; leaves large obovate narrowed at both ends scabrous finally glabrate, bracts elliptic long acuminate, bracteoles lanceolate acuminate, corolla 1½–1¾ in. Ruellia flava, *Roxb. Fl. Ind.* iii. 43, and *Ic. Ined.*; *Nees in DC. Prodr.* xi. 153. Strobilanthes scaber, *T. Anders. in Thwaites Enum.* 227, *excl. all syn.*; *Benth. in Gen. Pl.* ii. 1087 (as to the Pegu plant). S. flavus, *Kurz For. Fl.* ii. 243.

PEGU; *Roxburgh, Kurz.* MOULMEIN; *Griffith* (Herb. Propr. n. 278), *Lobb.* TENASSERIM; *Beddome.* CEYLON?; *Walker* (? cultivated).

A shrub; branches glabrous. *Leaves* 8 by 3 in., minutely crenulate, tubercular, scabrous, becoming nearly glabrous; petiole ½ in. *Heads* terminal on the arms of a panicle, dense, sparingly ciliate or glabrous; bracts ¾ in.; bracteoles ½ in. *Sepals* nearly ½ in., linear. *Corolla* densely hairy within, ventricose portion about as long as the cylindric. *Anthers* connivent in pairs. *Ovary* with (at least) 6 ovules. *Capsule* (fide Kurz) 8-seeded.—The inflorescence is Strobilanthes-like, and it might be more naturally placed in *Strobilanthes*; but it is very distinct specifically from *S. scaber*, Nees, by the 6–8 ovules, very much longer flower and bearded filaments. —The 3 examples ticketed as from Ceylon have 6 ovules, and seem identical with the Pegu plant. Nees' *S. scaber* was a purple-fld. species founded on Wight n. 1945, on which type-sheet T. Anderson has written *S. heteromallus*, T. Anders., nov. sp.

XVI. STENOSIPHONIUM, *Nees.*

Shrubs. *Leaves* ovate or elliptic, acuminate, lower tapering into the petiole, upper subsessile, subcordate, crenate, upper surface densely covered by raphides. *Flowers* sessile, solitary or 2–3-nate in opposite axils; clusters running into close or interrupted spikes, or panicled; bract ovate or lanceolate; bracteoles 2, narrow, about as long as the calyx. *Calyx* subequally 5-fid, segments linear or lanceolate, imperfectly connate often for half their length. *Corolla* tubular-ventricose, suddenly widened about the middle; limb oblique, lobes 5, subequal, twisted to the left in bud. *Stamens* 2 perfect, or 4 perfect the 2 posterior much the smaller, anterior usually exserted; anthers oblong, 2-celled, muticous. *Ovary* and *style* glabrous, or at the apex of the ovary glandular. *Disc* small, annular. *Stigma* simple; ovules 3–4 in each cell. *Capsule* oblong-linear, seed-bearing nearly from the base. *Seeds* 6–8, on stout hooked retinacula, compressed, discoid, apparently glabrous; when moistened the abundant white hairs of extreme tenuity straighten out.—Species 5, all of the Deccan and Ceylon.

1. **S. diandrum,** *Wight Ic.* t. 1502 (*not of Nees*); leaves rhomboid-elliptic or ovate, spikes interrupted viscous-pubescent, bracts ovate shorter than the calyx, flowering calyx divided more than half-way down teeth

linear viscous-pubescent, stamens 2. S. confertum, *T. Anders. in Journ. Linn. Soc.* ix. 464, *partim.*

S. MADRAS; Courtallum, *Wight.*

Branches glabrous. *Leaves* 3 by 1⅓ in., young obscurely scabrous beneath; petiole ⅓ in. *Spikes* 2–3 in., in terminal panicles, densely clothed with minute patent gland-headed hairs; lower whorls mostly 4–6-fld., distant even at flower-time; bract ¼ in., ovate with a short obtuse apex; bracteoles rather longer than the bract, similar to the calyx-segments. *Calyx* ⅓ in.; segments linear-ligulate (not subulate), united at flower-time about ⅓ their length, in fruit free. *Corolla* exceeding ¾ in. Anterior *filaments* minutely hairy at the base, posterior reduced to 2 microscopic teeth.

2. **S. confertum,** *Nees in DC. Prodr.* xi. 105; leaves rhomboid-elliptic or ovate, spikes scarcely interrupted viscous-hairy, bracts obovate shorter than the calyx, flowering calyx divided nearly half-way down segments linear viscidly hairy, stamens 4. *T. Anders. in Journ. Linn. Soc.* ix. 464, *partim.* S. Russellianum, *Wight Ic.* t. 873, *not* t. 1503, *as see Wight's note under the latter.*

S. DECCAN; Pulney Mts. and near Courtallum, *Wight.*

Very near *S. diandrum*, Wight, and united therewith by T. Anderson; probably the posterior stamens may be present or absent in the same species. The present plant differs from *S. diandrum* in the leafy habit and shortened very hairy spikes, which have numerous white simple hairs in addition to the gland-tipped hairs. The stamens differ from those of all the other species, being all exserted; but the anthers of the posterior pair are hardly ⅓ as long as those of the anterior (this is not correctly shown by Wight).

3. **S. setosum,** *T. Anders. in Journ. Linn. Soc.* ix. 464; leaves rhomboid-elliptic or ovate, flowering spikes dense somewhat interrupted below very hairy, bracts linear as long as the calyx, stamens 2.—Strobilanthes n. 67, *Herb. Ind. Or. H.f. & T.*

MYSORE or CARNATIC; *G. Thomson.*

Leaves altogether as of *S. diandrum. Spikes* 2–5 in., with white simple and gland-tipped hairs; bracts ⅓ in. and upwards, linear only slightly widened towards the base. *Calyx-segments* united for about ⅓ their length at flower-time, subulate, very hairy. *Flowers, stamens* and *capsules* exactly as of *S. diandrum*, from which this species hardly differs except by the bracts.

4. **S. Russellianum,** *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 105; leaves rhomboid-elliptic or ovate glabrous beneath, spikes linear much interrupted, bracts ovate as long as the calyx, corolla ¾–1 in., stamens 4. *Wight Ic.* t. 1503 (*not* t. 873); *T. Anders. in Journ. Linn. Soc.* ix. 464, *partly.* Ruellia Russelliana, *Wall. Cat.* 2400. R. arcuata, *Wall. Cat.* 2334 a & b.

S. DECCAN PENINSULA; plentiful in and around the Nilgherries, *Wight,* &c. CEYLON; *Walker, Thwaites.*

Stems and *leaves* as of *S. diandrum. Spikes* 3–6 in., elongate, all the whorls generally distinct even at flower-time, glabrous except a few minute bristles at the sepal-tips or (in Wight's n. 2189) sparingly glandular-pubescent; bracts (from the middle of the spike) ⅓ in., rhomboid, shortly obtusely mucronate, but the lower bracts often pass into leaves being ¾ in. broad cordate-ovate, and the upper are often narrowly obovate. *Calyx* ⅓ in., segments united to the middle, teeth narrowly lanceolate acuminate, glabrous with minute white bristles or glandular-pubescent. Anterior *filaments* very hairy at their base; posterior about half as long, included. *Pistil* and *capsule* as in *S. diandrum.*

VAR. *subsericea, T. Anders. in Journ. Linn. Soc.* ix. 464; younger leaves densely white-silky beneath mature silky or glabrous beneath. S. subsericeum, *Nees in Wall.*

Pl. As. Rar. iii. 84, and in *DC. Prodr.* xi. 105. Ruellia cordifolia, *Vahl Symb.* iii. 84. R. sesamoides, *Wall. Cat.* 2408, *part of sheet* A *only*. R. subsericea, *Wall. Cat.* 2416. R. canescens, *Heyne in Herb. Rottler.*—S. Deccan Peninsula, *Rottler*; Courtallum, *Wight*.

Often twiggy, with small leaves.

5. **S. parviflorum,** *T. Anders. in Journ. Linn. Soc.* ix. 464; leaves rhomboid-elliptic or ovate glabrate, spikes linear subinterrupted at base, bracts lanceolate, calyx small, teeth linear glandular-pubescent, corolla ½–⅔ in., stamens 2.—Strobilanthes sp. n. 68, *Herb. Ind. Or. H.f. & T.*

MYSORE or CARNATIC; *G. Thomson.*

Very near *S. Russellianum,* differing mainly by the smaller calyx and corolla and narrower bracts. *Bract* ⅓ in. *Calyx* scarcely ¼ in., divided half-way down. *Stamens* 2 only in n. 68 *H.f. & T.*; when T. Anderson says 4, he must have examined *Wall. Cat.* 2334 a & b; which T. Anderson referred to *S. parviflorum,* but which is typically *S. Russellianum,* Nees.

XVII. ÆCHMANTHERA, *Nees.*

Small, hairy *shrubs*. *Leaves* broad-elliptic acute, crenate, often viscid. Clusters of *flowers* sessile on the branches of a trichotomous or 1-sided panicle, distant or close; bracts linear, as long as the calyx; bracteoles similar smaller. *Calyx* sub-5-partite; segments linear, subequal. *Corolla* tubular-ventricose, nearly straight, widened suddenly near the middle, glabrous, 2 hairy lines on the palate within; segments 5, subequal, rounded, twisted to the left in bud, pale-violet or purplish. *Stamens* 4, didynamous, included, longer filaments hairy, shorter glabrous; anthers subsimilar, ovate or oblong, 2-celled, cells muticous; connective excurrent at the tip or not. *Ovary* densely hairy at the apex; style sparsely hairy thickened upwards, stigma large simple linear-lanceolate; ovules 4–6 in each cell. *Capsule* narrowly oblong, 6–8- (or ex Benth. 12-) seeded from the base, retinacula strong, hooked. *Seeds* discoid, densely hairy, or thicker glabrous. —Species 2, Indian.

1. **Æ. tomentosa,** *Nees in Wall. Pl. As. Rar.* iii. 87; leaves elliptic acute hairy, bracts linear-ligulate as long as the calyx, anthers oblong connective not excurrent, seeds densely hairy. Ruellia tomentosa, *Wall. Cat.* 2333.

TEMPERATE HIMALAYA, alt. 3–5000 ft.; Kumaon and Nepal, *Wallich, Thomson.*

A small shrub, 1–3 ft., dusky grey or whiteish, villous, not with snowy or silvery wool. *Leaves* 4½ by 2 in., base rounded, slightly crenate, densely (not prominently) lineolate with raphides; petiole 1½ in. *Panicles* often 1 foot, one-sided; clusters 3–8-fld., distant or approximate; bracts ½ in. or more; bracteoles narrowly ligulate, as long as the calyx or more often about half as long. *Sepals* ⅓–½ in., linear-ligulate, somewhat unequal, herbaceous, pubescent, usually viscous. *Corolla* 1 in. *Anthers* particularly obtuse in *Wall. Cat.* 2333, and the examples closely similar therewith, even in the buds just before expansion. *Capsule* ½ in., 8-seeded; hairs of the seeds starting out when wetted.

VAR. *Wallichii*; stem and leaves with snow-white wool or glabrate sparsely hairy, anthers ovate, tip of the connective excurrent recurved. Æ. Wallichii, *Nees in DC. Prodr.* xi. 170; *T. Anders. in Journ. Linn. Soc.* ix. 485. Æ. gossypina, *Nees in Wall. Pl. As. Rar.* iii. 87. Ruellia gossypina, *Wall. Cat.* 2332, and *Pl. As. Rar.* i. 38, t. 42.—Acanthacea, *Griff. Itin. Notes,* 119, n. 308.—Temperate Himalaya, alt. 3–5000 ft., from Kashmir to Bhotan. Chittagong; Seetakoond, alt. 1000 ft., *H.f. & T.*—Wallich's figure shows the connective non-excurrent, but it always is more or

less so in the white-woolly form. In the two examples on one sheet marked by Nees' hand *Wallichii* and *tomentosa,* the former has the connective conspicuously, the latter minutely, excurrent. The East Himalaya examples are flowerless, and may belong to *Æ. tomentosa,* type. The Chittagong example is densely snowy-woolly with 6 hairy seeds, and is therefore *Æ. tomentosa* var. *Wallichii,* or a new species.

2. **Æ. leiosperma,** *Clarke*; hairy, leaves ovate or elliptic acute, bracts linear-ligulate as long as the calyx, anthers oblong connective excurrent at the tip, seeds glabrous.

JAINTEA and E. KHASIA, alt. 3–4000 ft.; abundant, *Clarke.*

A small shrub, 2–3 ft. high, very hairy, often viscid, with both brown and white hairs. *Leaves* 3 by 1½ in., rounded at the base, crenulate; petiole ½ in. *Panicle* resembling that of *Æ. tomentosa,* often somewhat leafy; bracts ½ in., linear-ligulate; bracteoles ⅓ in., similar to the bracts. *Sepals* ⅓ in., subequal, linear-ligulate, very hairy. *Corolla, stamens* and *pistil* as of *Æ. tomentosa,* but the connective more excurrent than in any form of *Æ. tomentosa. Capsule* ½ in., 6-seeded. *Seeds* much thicker than in *Æchmanthera,* and without hairs.—I cannot match these seeds without going to quite another part of the Acanthaceous Order. They are glabrous when *wetted,* not discoid. On the other hand, except the seeds, the plant is hardly distinguishable from *Æ. tomentosa.* There are abundant specimens with seeds *in situ.*

XVIII. STROBILANTHES, *Blume.*

Large or small shrubs, or herbs. *Leaves* opposite, often unequal, in *S. anisophyllus* often apparently alternate, toothed or subentire, often bearing raphides. *Flowers* capitate, or in strobiliform or interrupted spikes, or panicled, sessile or sometimes pedicelled, purple yellow or white; bracts and bracteoles large or small or 0, persistent or caducous. *Calyx* deeply subequally 5-fid; or (in Sect. Buteræa) 2-lipped, with one lip very shortly 3-toothed; segments narrow, equal or unequal. *Corolla* tubular-ventricose, straight or curved; lobes 5, ovate or round, subequal, contorted in bud. *Stamens* 4, didynamous, or (in Sect. Endopogon) 2; anthers oblong, 2-celled, muticous. *Disc* small, or prominent as a stalk to the ovary. *Ovary* 4-ovulate; style linear, stigma of one long linear-lanceolate branch, the other suppressed. *Capsule* 4- or 2-seeded; placentæ (in a few species only) rise elastically from the base, carrying the seeds with them. *Seeds* much compressed, glabrous or hairy, hairs elastic when wetted; retinacula curved, strong.—Species 180, Asiatic and 1 in Africa.

This genus contains a great number of species differing widely in habit, inflorescence and size of the flowers. It is here limited to species with 2 ovules in each cell of the ovary. All with more than 2 in each cell have been carried to *Ruellia, Echinacanthus, Hemigraphis, Stenosiphonium* and *Æchmanthera.*

Strobilanthes roseus, Wall. Cat. 7154, is an Ava plant, not known from British India.

Stobilanthes salicifolius, T. Anders. in Journ. Linn. Soc. ix. 484, is a plant of altogether uncertain origin.

Strobilanthes biceps, T. Anders. in Journ. Linn. Soc. ix. 476 = Goldfussia biceps, Wall. Cat. 7161, Nees in DC. Prodr. xi. 172, is an Ava plant.

Key to the Sections of *Strobilanthes.*

Subgenus 1. BUTERÆA. Calyx bilabiate. Species 1–4, of Pegu and Tenasserim.

Subgenus 2. ENDOPOGON. Stamens 2.

Seeds glabrous. Species 5–12, of Ceylon with 1 in S. Deccan.
Seeds hairy. Species 13–18, of S. Deccan.
Species 19, 20, of Khasia.

Subgenus 3. EUSTROBILANTHES. Calyx subequally deeply 5-fid. Stamens 4.
Series A. *Bracteatæ.* Bracts persistent. Flowers spiked or opposite, not mostly alternate.
* Flowers capitate or shortly spicate.
† Seeds glabrous. Species 21–32, of Ceylon and Deccan.
†† Seeds hairy.
¶ Species 33–46, of Ceylon and Deccan.
¶¶ Species 47–56, of N. India and Malay Peninsula.
** Flowers strobilate.
† Seeds glabrous. Species 57–64, of Ceylon and Deccan.
†† Seeds hairy. Species 65–78.
*** Spikes elongate often much interrupted. Species 79–87.
Series B. *Nudatæ.* Bracts caducous. Flowers capitate or opposite, not mostly alternate.
* Heads in fruit capitate. Species 88–100.
** Heads in fruit elongate or flowers distant. Species 101–119.
Series C. *Alternifloræ.* Flowers mostly distant alternate, or panicled. Species 120–136, of N. India and Malaya.
Series D. *Paniculatæ.* Bracts persistent. Flowers panicled or interruptedly spicate. Capsule wide, very acute. Species 137–145, of Ceylon and S. Deccan.
Residuary. Species 147–154, not seen.

Subgenus 1. **Buteræa.** *Calyx* 2-lipped to the base; one lip 3-fid less than one-third the way down, the other 2-fid or 2-partite.—(Spikes strobiliform; bracts prominent, imbricate. *Stamens* 4. *Seeds* (where known) elastically hairy when wetted.—Species of Pegu and Tenasserim.)

1. **S. rufescens,** *T. Anders. in Journ. Linn. Soc.* ix. 472; leaves ovate acute crenate more or less rufous-hairy, spikes dense strobilate hirsute, bracts broadly ovate, calyx 2-partite both segments very shortly toothed. Ruellia rufescens, *Roth Nov. Sp.* 304. R. comosa, *Roxb. Fl. Ind.* iii. 43, and *Ic. Ined. in Herb. Kew.* R. ulmifolia, *Wall. Cat.* 2360. Buteræa ulmifolia, *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 196.

PEGU; *Brandis.*—DISTRIB. Moluccas (*Roxburgh*).

A shrub; branches perfectly glabrous, or intensely shaggy with red hairs $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Leaves* 1½–4 in., often unequal, base obtuse or rounded, hirsute on both surfaces in the type examples, nerves 6 pair; petiole $\frac{1}{8}$–1½ in. *Spikes* 1–2 in., short-peduncled; bracts $\frac{1}{3}$ in., fulvous-hirsute; bracteoles scarcely $\frac{1}{6}$ in., sublinear. *Calyx* $\frac{1}{3}$ in., 2-partite to the base, rufous-ciliate towards the apex; segments very shortly toothed, one 2-toothed, the other 3-toothed with the middle tooth broader subemarginate. *Corolla* 1 in., pale-purple, cylindric base of the tube rather shorter than the moderately ventricose part. *Capsule* $\frac{1}{4}$ in., densely pubescent, 4-seeded. *Seeds* less than $\frac{1}{12}$ in., orbicular, fine elastically white-hairy, areoles 0.

VAR. *rubiginosa*; leaves larger thinner glabrate lineolate above, bracteoles $\frac{1}{16}$ in., ovate.—Tenasserim; *Helfer* (Kew Distrib. n. 6118). Chittagong; *Clarke.*—Stems thinly shortly rufous-hirsute; leaves 5½ by 2¾ in., base shortly acuminate, crenate, green, herbaceous; nerves beneath thinly rufous-hairy.—Helfer's example is unlike those of *Ruellia ulmifolia*, but very like the figure of *R. comosa*, Roxb. Clarke's examples have the stems sparsely or densely rufous-hirsute, the leaves glabrate lineolate above or rufous-hirsute; the corolla is 1¼ in., pale-purple, nearly glabrous with glabrous filaments, altogether as in Roxburgh's picture.

2. **S. acuminatus,** *T. Anders. in Journ. Linn. Soc.* ix. 473, *partly*; leaves lanceolate acuminate at both ends crenate nearly glabrous, spikes oblong short-peduncled glandular, bracts ovate shorter than the calyx, calyx sub-2-partite one lip shortly trifid the other bifid nearly to the base. S. subflaccidus, *Kurz in Journ. As. Soc.* 1873, pt. ii. 94, *ex descr.* Adena-

canthus acuminatus, *Nees in Wall. Cat.* 7153, and in *Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 197 (*excl. tab. cited*).

BURMA; "locus incertus," *Wallich.*

A herb; branches elongate, nearly glabrous. *Leaves* 5 by 1½ in., base long attenuate, often subserrate, lineolate above; nerves 6–7 pair, minutely fuscous pubescent beneath; petiole 0–⅓ in. *Peduncles* ¼–2 in.; spikes ½–1 in.; bracts ¼ in., ovate; bracteoles ¼ in., elliptic, wider upwards than the bracts. *Calyx* scarcely ⅓ in., glandular-ciliate. *Corolla* (ex Nees) ½ in. at least, glabrous, tubular; limb equal with obtuse segments. *Ovary* 4-ovulate. *Capsule* not known.—Description mainly from Nees, the single sheet of Wallich being too imperfect to verify several points. T. Anderson, proceeding on the similarity in the leaves, has assumed that Nees' description is materially wrong, and that Wall. Cat. 7152 is really identical with *S. longipes*, n. 76 infra. If that be so, it remains as *S. subflaccidus*, Kurz.

3. **S. Parishii,** *Clarke*; leaves elliptic acuminate thinly hirsute, spikes linear-oblong strobilate white-hairy, bracts oblong or slightly wider upwards, calyx 2-partite both segments very shortly toothed.

MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

A branching herb; stems subterete rufous-pubescent or subhirsute. *Leaves* 5½ by 2¼ in., base cuneate or obtuse, crenate, nerves 6 pair; petiole ½–2 in. *Spikes* 2 by ½ in., short-peduncled; bracts ½ by ⅛–⅙ in., obtuse; bracteoles ⅙ in., linear. *Calyx* ⅓ in., nearly as of *S. rufescens. Corolla* 1¼ in., nearly straight, glabrous, blue; cylindric base of the tube hardly half so long as the campanulate; lobes short, round. *Capsule* ¼–⅓ in., pubescent, 4-seeded. *Seeds* scarcely 1/12 in., orbicular, elastically white-hairy; areoles hardly any.

4. **S. fœtidissima,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 93; leaves ovate acuminate at both ends serrate-dentate hirsute on both surfaces, spikes short-peduncled lax short tawny-hirsute, bracts obovate-cuneate obtuse, calyx-segments deeply lobed.

MARTABAN; *Kurz.*

A herb; branches fulvous-hairy. *Leaves* 3–5 in., membranous, long-petioled. *Bracts* 4/5 in., glandular-hirsute; bracteoles similar, but shorter and broader. *Calyx* as long as the bracts, adpressedly glandular-puberulous. *Corolla* 1½ in., and *filaments* glabrous. *Style* hirsute. *Capsule* 4/5 in., glabrous. *Seeds* 1/5 in. diam., adpressedly villous.—Copied from Kurz, who says it is allied to *S. rufescens*, whence it is presumed the calyx is definitely 2-lipped; but in the large capsule and seeds it differs from the other species allied to *S. rufescens.*

Subgenus 2. **Endopogon.** *Calyx* deeply subequally 5-fid. *Stamens* 2 fertile.—(Spikes mostly continuous, sometimes shortened into heads, less commonly interrupted at the base, the lowest flowers then in opposite pairs; bracts persistent).

* Seeds (*even in water*) *glabrous, without areoles on the faces.—Lower half of the* corolla-tube *cylindric, suddenly widening into the ventricose part.*—Species of Ceylon, with one (*S. foliosus*) in the S. Deccan Peninsula.

5. **S. viscosus,** *T. Anders. in Thwaites Enum.* 226, *excl. syn. Wight*, and in *Journ. Linn. Soc.* ix. 465, *partly*; leaves elliptic acuminate at both ends crenulate sparsely pubescent or glabrate, spikes linear subinterrupted viscous-hairy, flowering calyx ⅓ in. divided less than half-way down. Endopogon viscosus, *Nees in DC. Prodr.* xi. 104, *excl. Var. humilis, not of Wight.*

CEYLON, up to 7000 ft. alt., frequent; *Gardner, Walker, Thwaites* (n. 2898, n. 2002, *partly*), &c.

A shrub, 2–5 ft. *Leaves* 4 by $1\frac{3}{8}$ in.; nerves 7–8 pair, not conspicuously parallel; petiole $\frac{3}{4}$ in. *Spikes* 3–8 in., axillary, simple or compound, and running into terminal panicles; flowers opposite, lowest pair usually distant; bracts $\frac{1}{2}$ in., elliptic or oblong, attenuated upwards; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in., narrow. *Calyx* viscidly hairy, teeth lanceolate; calyx in fruit enlarged often $\frac{2}{3}$ in. or more, split to the base into lanceolate segments. *Corolla* $1\frac{1}{2}$ in., densely pubescent without; linear-base of the tube $\frac{1}{3}$ in., very narrow, ventricose portion $\frac{1}{2}$ by $\frac{1}{3}$ in., oblique, lobes ovate. *Filaments* glabrous except near the base; anthers large, pendulous, subexserted. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* more than $\frac{1}{8}$ in., ovoid, thinning towards the apex, smooth, hairless.

VAR. *microphyllus*, Nees in DC. Prodr. xi. 104; leaves $\frac{1}{2}$–$1\frac{1}{4}$ in., spikes very weak few-fld.—Ceylon.—The type specimen of this has no fruit; but Walker, n. 122, has similar small leaves and fruit exactly as of *S. viscosus* type.

VAR. *digitalis*; bracts abbreviated, spikes elongate slender, minutely deciduously cinereous-woolly not hairy nor viscous. Endopogon digitalis, *Nees in DC. Prodr.* xi. 104 (sp.).—Ceylon; *Walker*.—This is possibly nearer *S. exareolatus*, but the example is in young flower.

VAR. *arguta*; leaves more rigid more acutely (though minutely) toothed, spikes dense, bracts $\frac{1}{2}$ in. oblong imbricate, calyx minutely cinereous-woolly. Endopogon argutus, *Nees in DC. Prodr.* xi. 104.—Ceylon; *Gardner*.—The examples referred here by Nees (probably on the characters of the leaves) having fulvous viscid hairy spikes seem nearer *S. viscosus*, T. Anders. type.

6. **S. stenodon,** *Clarke*; glabrous, leaves ovate acuminate crenate, spikes linear scarcely interrupted, bracts short obovate, calyx divided half-way down, corolla-lobes narrowly oblong.

CEYLON; Matelle East, *Beckett, Thwaites*, C. P. n. 3874.

Leaves $4\frac{1}{2}$ by 2 in., shortly narrowed into the petiole; nerves 8 pair; petiole $1\frac{1}{2}$ in.; leaves white underneath in Beddome's Ceylon specimen. *Spikes* 2–5 in., axillary, simple or compound, running into terminal panicles; bracts $\frac{1}{4}$ in.; bracteoles $\frac{1}{6}$ in., narrowly oblong. *Calyx* glabrous, teeth lanceolate. *Corolla* glabrous in bud, white-hairy within; cylindric base $\frac{1}{3}$ in., very narrow; ventricose tube $\frac{1}{3}$ in. long and broad; lobes $\frac{1}{3}$–$\frac{1}{2}$ in. *Anthers* exserted, pendulous. *Ovules* 2 in each cell. *Capsule* not seen.—A remarkable plant with the habit, inflorescence and bracts of *Stenosiphonium Russellianum*; the narrow lobes of the corolla are unlike any neighbouring species or genus.

7. **S. exareolatus,** *Clarke*; leaves elliptic acuminate at both ends slightly undulate crenate glabrous, spikes linear lax hairy, calyx narrow overtopping the bracts divided less than half-way down. S. consanguineus, *T. Anders. in Thwaites Enum.* 226, and in *Journ Linn. Soc.* ix. 465, *partly.* Stenosiphonium diandrum, *Nees in DC. Prodr.* xi. 105, *not of Wight.* Endopogon consanguineus, *Nees l. c. as to the Ceylon material.*

CEYLON, alt. 3000 ft.; *Walker.*

A shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in.; nerves 6 pair; petiole $\frac{3}{4}$ in. *Spikes* 2–4 in., running into terminal panicles; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., ovate or oblong; bracteoles $\frac{1}{3}$ in., narrow. *Calyx* (in flower) $\frac{1}{4}$–$\frac{1}{3}$ in., teeth sublinear; in fruit enlarged. *Corolla* $\frac{3}{4}$ in., resembling that of *S. viscosus* but smaller. *Capsule* $\frac{1}{3}$ in., 4-seeded. *Seeds* scarcely $\frac{1}{10}$ in., ellipsoid, smooth, hairless, without lateral areoles.—Near *S. viscosus*, differing by the short bracts, narrow cylindric calyx, smaller flowers and much smaller seeds. As to the synonyms, the type specimens of Nees and T. Anderson, written on by their own hands, are preserved at Kew.

VAR. *densa*; spikes denser, bracts elliptic imbricate often as long as the calyx.—Ceylon, alt. 2–6000 ft.; *Thwaites*, n. 2002 chiefly, &c.

8. **S. rhytisperma,** *Clarke*; leaves elliptic acuminate at both ends denticulate thinly white-cottony beneath, spikes linear uninterrupted glabrous, bracts lanceolate about equalling the calyx. S. hypoleucus, *T. Anders. in Thwaites Enum.* 226, *not* Endopogon hypoleucus, *Nees.*

CEYLON; Central Province, *Thwaites*, C. P. 2897, collected by Gardner.

Stem glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., mature glabrous above; nerves 8 pair; petiole $\frac{2}{3}$ in. *Spikes* 3–4 in., clustered in the axils (end of the branch not seen); bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{3}$ in., divided half-way down, hardly enlarged in fruit; teeth narrowly lanceolate, glabrous. *Corolla* glabrous without in bud. *Capsule* $\frac{1}{3}$ in., 4-seeded. *Seeds* $\frac{1}{10}$ in., obovate-elliptic, smooth, hairless, longitudinally wrinkled, without lateral areoles.

9. **S. nigrescens,** *T. Anders. in Thwaites Enum.* 226. and in *Journ. Linn. Soc.* ix. 465; leaves narrowly elliptic acuminate at both ends serrulate glabrous, spikes linear uninterrupted hirsute, bracts lanceolate mostly overtopping the calyx. *Bedd. Ic. Pl. Ind. Or.* t. 217.

CEYLON, alt. 3000 ft.; *Thwaites*, C. P. n. 3353.

A shrub, 4–5 ft., blackish-green when dry. *Leaves* 5 by $1\frac{3}{4}$ in., lineolate above, reticulate beneath; nerves 7 pair; petiole $1\frac{1}{4}$ in. *Spikes* 2–5 in., axillary, simple or compound, and running into terminal panicles; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in., narrow. *Calyx* $\frac{1}{3}$ in. and upwards hairy, divided about half-way down, enlarged in fruit. *Corolla* pale-purple, very nearly as of *S. viscosus*. *Capsule* $\frac{2}{3}$ in., very broad and stout, 2-seeded (in Thwaites, 3353). *Seeds* $\frac{1}{4}$ in. diam. (unripe), hairless and without lateral areoles.

10. **S. rhamnifolius,** *T. Anders. in Thwaites Enum.* 226, and in *Journ. Linn. Soc.* ix. 466; leaves ovate shortly acuminate crenate-serrulate glabrous, spikes linear-oblong very hairy densely panicled, bracts widely-elliptic imbricated. Buteræa rhamnifolia, *Nees in DC. Prodr.* xi. 725. Endopogon rhamnifolius, *Wight Ic.* t. 1521.

CEYLON, *Gardner*; alt. 3000 ft., *Thwaites*, C. P. n. 2007.

A shrub, 1–2 ft., hairy upwards. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base obtusely rhomboid; nerves 6 pair; petiole $1\frac{1}{4}$ in. *Spikes* 1–4 in.; bracts $\frac{2}{3}$ in., not acuminate; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in., linear-oblong. *Calyx* $\frac{1}{3}$ in., very hairy, divided hardly half-way down (not so deeply as figured by Wight); teeth narrowly lanceolate. *Corolla* 1–$1\frac{1}{4}$ in., purple, pubescent, cylindric portion more than $\frac{1}{4}$ in., very narrow, ventricose portion $\frac{1}{3}$–$\frac{1}{2}$ in.; teeth ovate. *Stamens* 2; filaments sparsely hairy more than half their length. *Ovules* 2 in each cell.—The habit, bracts and shape of the corolla are much as in *S. exareolata* var. *densa*; but the capsule and seeds being unknown, the exact position is doubtful.

11. **S. deflexus,** *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; glabrous, leaves lanceolate acuminate at both ends denticulate, heads peduncled few-fld. closely capitate. *Bedd. Ic. Pl. Ind. Or.* t. 218.

CEYLON, alt. 3–4000 ft.; *Gardner, Thwaites*, C. P. 1998.

A shrub, 4–5 ft., green. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in.; nerves 6 pair; petiole 1 in. *Peduncles* axillary, 1–$1\frac{1}{2}$ in., thickened upwards, deflexed; outer bracts $\frac{3}{4}$ in., elliptic, often nearly enclosing the whole head; proper bract $\frac{2}{3}$ in., lanceolate; bracteoles rather shorter, linear. *Calyx* $\frac{2}{3}$ in., divided half-way down, glabrous or the linear-lanceolate teeth puberulous. *Corolla* $\frac{3}{4}$–1 in., pale purple, nearly glabrous, hairy in the palate within; cylindric base of the tube as long as (and suddenly widened into) the ventricose portion, not so funnel-shaped as in Beddome's figure. *Stamens* 2, glabrous. *Pistil* glabrous. *Capsule* not seen; and, the seeds being unknown, the affinity is doubtful.

12. **S. foliosus,** *T. Anders. in Journ. Linn. Soc.* ix. 467; leaves ovate serrulate glabrous, heads sessile ovoid densely capitate. Goldfussia Leschenaultiana, *Nees in DC. Prodr.* xi. 172. Endopogon foliosus & capitatus, *Wight Ic.* tt. 1501, 1499.

NILGHERRY MTS., alt. 6–7000 ft., frequent; *Gardner, Wight*, &c.

Stems 1–2 ft., much branched, rigid. *Leaves* 2 by $1\frac{1}{4}$ in., shortly acuminate at both ends, conspicuously lineolate above; nerves 5–6 pair; petiole $\frac{1}{3}$ in. *Heads* numerous, terminal, $\frac{1}{2}$ in. diam., each closely embraced by the two uppermost leaves (exclusive of the proper bracts); bracts $\frac{3}{4}$ in., linear-oblong, at first nearly glabrous or hairy; bracteoles $\frac{2}{3}$ in., linear, at first nearly glabrous or hairy. *Calyx* $\frac{3}{4}$ in., divided hardly half-way down, obscurely or prominently hairy at flower-time, hirsute in fruit, segments narrowly lanceolate. *Corolla* $1\frac{1}{4}$ in., blue or whiteish, glabrous without, hairy along 2 lines within; linear base of the tube about as long as the suddenly-widened ventricose part. *Filaments* hairy nearly to the summit; rudiments often 3, whereof 2 often carry minute rudimentary anthers. *Ovary* slightly hairy upwards. *Capsule* $\frac{2}{3}$ in., 4-seeded. *Seeds* $\frac{1}{6}$ in. long, very thin, glabrous; areoles 0.—There is no difference between the typical *foliosus* and the Var. *capitatus*; the heads on one stem which appear (superficially) glabrous in flower are very hairy in fruit, owing to the development of the hairs on the bract, bracteoles and calyx.

** *Seeds* (in water) densely hairy except on two lateral circular areoles near the base on each face.—(Linear or subcylindric base of the corolla short, more gradually narrowing into the ventricose portion than in the preceding section.—Species of the S. Deccan Peninsula.)

13. **S. Kunthianus,** *T. Anders. in Journ. Linn. Soc.* ix. 465; leaves elliptic narrowed into the petiole crenate-serrate rigid strongly nerved beneath, spikes dense, bract ovate, calyx deeply divided, corolla 1 in. blue. Ruellia Kunthiana, *Wall. Cat.* 2367. Phlebophyllum Kunthianum, *Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 102; *Wight Ic.* t. 448. P. angustifolium, *Benth. in Pl. Hohenack.* n. 1178.

MTS. of S. DECCAN PENINSULA, alt. 5000–7500 ft.; plentiful in the Nilgherries, *Wight*, &c.

Stems 12–20 in., numerous, erect, rigid, quadrangular upwards. *Leaves* 2 by 1 in., obtuse or subacuminate, bristly or scabrid above; primary nerves beneath close, parallel, prominent, secondary reticulated more or less concealed by close hard white tomentum; petiole $\frac{1}{4}$ in., very broad. *Spikes* 1–3 in., hairy; bract $\frac{1}{2}$ in.; bracteoles $\frac{1}{3}$ in., linear-ligulate. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., floccose-villous; segments linear-lanceolate, base shortly connate. *Corolla* ventricose from near the base, palate hairy within, blue or whiteish. *Filaments* pilose. *Ovary* glabrous; style hairy. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in., oblong, rigid. *Seeds* 4, densely hairy (hairs spreading when wet) except on the circular basal areola on each of its faces.

14. **S. gossypinus,** *T. Anders. in Journ. Linn. Soc.* ix. 466; leaves ovate acute entire woolly beneath, spikes linear-oblong woolly, corolla $1\frac{1}{4}$ in. woolly without. *Bedd. Ic. Pl. Ind. Or.* t. 198.

MTS. of S. DECCAN PENINSULA, alt. 4000–5500 ft.; Mysore, *Lobb*; Sispara plentiful, &c., *Beddome*.

Shrubby, covered (except the leaves above) with dense yellowish wool, flowering at 6–7 years old, then dying. *Leaves* 4 by 2 in., base broadly rhomboid, subcoriaceous, wool of upper surface deciduous; nerves 13 pair, approximate, subparallel; petiole $\frac{3}{4}$ in. *Spikes* 1–3 in., compound and (by the reduction of the upper leaves) running into terminal panicles; bracts $\frac{1}{3}$–$\frac{1}{2}$ in., elliptic, obtuse; bracteoles $\frac{1}{3}$ in., linear-oblong. *Calyx* nearly $\frac{1}{2}$ in., divided about half-way down; segments narrowly lanceolate, subobtuse. *Corolla* nearly straight; ventricose portion of the tube much longer than the cylindric base. *Filaments* hairy. *Ovary* glabrous, with a few long hairs near the apex; style glabrous; ovules 4. *Seeds* not seen.

15. **S. canaricus,** *Bedd. Ic. Pl. Ind. Or.* t. 215; leaves ovate acuminate subentire mature puberulous on the nerves beneath, spikes linear-oblong minutely cinereous-lanate, bracts ovate, corolla $\frac{2}{3}$ in. white.

DECCAN PENINSULA; S. Canara, on the Kudra Mukh Mt., alt. 6000 ft., *Beddome.*

A rigid shrub, 3–4 ft.; tips of the branches and young leaves densely clothed with caducous yellowish wool. *Leaves* crowded towards the ends of the branches, 3 by 1½ in., base rhomboidal, mature nearly glabrous except the nerves beneath; nerves 9 pair, approximate, subparallel; petiole ⅓ in. *Spikes* 1–2 in., clustered in the upper axils, forming a dense terminal panicle, thinly, duskily, deciduously woolly; bracts ¼–⅓ in., ovate, obscurely acuminate; bracteoles scarcely ¼ in., narrowly lanceolate. *Calyx* ¼ in., divided half-way down; segments narrowly lanceolate. *Corolla* very pubescent, ventricose portion much longer than the cylindric base. *Filaments* hairy. *Ovary* glabrous, style minutely sparsely hairy; ovule solitary in each cell (in the only ovary examined), probably never as in Beddome's figure, which shows the ovules 2 in each cell, the lower pendulous.

16. **S. cuspidatus,** *T. Anders. in Journ. Linn. Soc.* ix. 465; leaves ovate acuminate subentire densely white silky beneath, spikes linear oblong glandular fulvous hairy, bracts narrowly elliptic acuminate, corolla 1 in. blue-purple. *Bedd. Ic. Pl. Ind. Or.* t. 221. Endopogon cuspidatus, *Benth. in Pl. Hohenack.* n. 1169, and in *Linnæa,* xxiv. 646. E. versicolor, *Wight Ill.* t. 164 b. fig. 4 (left-hand), and *Ic.* t. 1497, *both figure and description.*

NILGHERRIES, alt. 4–7000 ft., frequent; *Wight, Gen. Munro, &c.*

A shrub, 2–5 ft. *Leaves* 4 by 2½ in., base shortly acuminate, mature glabrous above, raphides not prominent; nerves 8 pair, approximate, subparallel; petiole 1¼ in. *Spikes* 1–3 in., often laxly panicled at the ends of the branches; bracts ⅝ in., base concave, acuminate, tip recurved; bracteoles ¼ in., linear. *Calyx* ½ in., divided ⅔ the way down; teeth linear, very glandular-hairy (not so lanceolate as in Beddome's figure). *Corolla* nearly glabrous; 2 rows of long white hairs on the palate within, between which the style (itself nearly glabrous, not as in Beddome's figure) lies. *Filaments* glabrous, except near the base. *Capsule* ½ in., 4-seeded; seeds discoid, with a circular areola on each face, densely hairy except on the areola.—T. Anderson refers *Wight Ic.* t. 1497 to *S. viscosus,* but the plant from which that figure was drawn is at Kew, and is *S. cuspidatus.*

17. **S. consanguineus,** *Clarke, not of T. Anders.*; leaves ovate acuminate obscurely toothed glabrous beneath, spikes linear-oblong glandular hairy, bracts narrowly elliptic hardly so long as the calyx, corolla ⅔ in. S. neglectus, *T. Anders. ms.* Endopogon consanguineus, *Nees in Wall. Pl. As. Rar.* iii. 99, and *partly in DC. Prodr.* xi. 104. Ruellia spicata, *Roth Nov. Sp.* 310; *Nees in DC. Prodr.* xi. 153.

S. MADRAS; Negapatam and Nilgherries, *Wight*; Courtallum, *Wight,* n. 1982.

Very similar to the last species; but the leaves are more distinctly toothed, the flowers smaller. *Leaves* glabrate, prominently lineolate above; nerves 7 pair. *Spikes* compound, axillary and terminal, often slender, sublinear. *Calyx* ⅓ in., divided half-way down or more; segments narrowly lanceolate, glandular-hairy. *Corolla-lobes* ovate, acute. *Filaments* glabrous, except at the very base. *Capsule* ¼–⅓ in., 4-seeded. *Seeds* discoid, areolate on both faces, densely hairy except on the areolæ.—This is the original *Endopogon consanguineus* of Nees, which was founded on Wight n. 1982, the example of which authenticated in Nees' hand is at Kew. Subsequently, in DC. Prodr., Nees united with this species the totally remote *S. exareolatus.* T. Anderson published (in *Thwaites Enum.* 226) this latter species as *S. consanguineus,* T. Anders., while he separated in the herbarium the old Wight n. 1982 on which he has written *S. neglectus,* nov. sp.

VAR. *Amomum*; leaves more clearly toothed, spikes slender minutely pubescent or very nearly glabrous, bracts acuminate to an obtuse apex often overtopping the calyx. S. consanguineus, *T. Anders. in Journ. Linn. Soc.* ix. 465, *partly*; *Bedd. Ic. Pl. Ind. Or.* t. 216. Ruellia sesamoides, *Wall. Cat.* 2408, *c and a chiefly.* Endopogon Amomum, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 104.—Nilgherries; *Wight,* n. 1980, &c.

VAR. *hypoleuca*; as Var. Amomum, but the leaves often (when young) silky white beneath. Ruellia sesamoides, *Wall. Cat.* 240 B. Endopogon hypoleucus, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 104. E. viscosus, Nees, Var. humilis, *Wight Ic.* t. 1498; *Nees in DC. Prodr.* xi. 104.—Mts of S. Madras, *Wight*; Bellary, *Beddome.*—A very trifling var. of the preceding Var. *Amomum*; but the Ceylon plant, the *S. hypoleucus* of T. Anderson, is the very different *S. rhytisperma.*

18. **S. jeyporensis,** *Bedd. Ic. Pl. Ind. Or.* t. 214; leaves ovate acuminate crenulate mature nearly glabrous, spikes linear-oblong viscidly patently hairy, bracts lanceolate acuminate recurved, corolla ½ in. white.

S. DECCAN PENINSULA; Golconda in Vizigapatam, alt. 2500 ft., and Mts. in Jeypore, *Beddome.*

A large shrub. *Leaves* 7½ by 4 in., base shortly acuminate, mature densely obscurely lineolate above, thinly puberulous beneath; nerves 11 pair; petiole 2¾ in. *Spikes* 1–2½ in., uninterrupted; bracts ⅜ in.; bracteoles ⅓ in., narrow. *Calyx* ½ in. and upwards, divided ⅔ the way down; segments linear from a short lanceolate base, patently hairy. *Corolla* nearly straight, ventricose portion of the tube much longer than the cylindric. *Ovary* 4-ovulate in Beddome's figure. *Capsule* ⅓ in., 2-seeded in Beddome's example. *Seeds* discoid, areolate on each face, densely hairy except on the areolæ.

*** *Species of the Khasia Hills.*

19. **S. adnatus,** *Clarke*; leaves widely elliptic acuminate at both ends subentire glabrous, spikes linear stout dense strobiliform, bracts ovate acute adnate, calyx and corolla small. S. decurrens, *T. Anders. in Journ. Linn. Soc.* ix. 470, *not of Nees* (in *DC. Prodr.* xi. 189). Endopogon decurrens, *Nees in DC. Prodr.* xi. 105.

KHASIA MTS., alt. 3–5000 ft., frequent; *Griffith, H. f. & T.*, &c. UPPER ASSAM; *Jenkins.*

A shrub, 2–4 ft., nearly glabrous. *Leaves* 6 by 2¼ in.; nerves 10 pair; petiole 1¼ in. *Spikes* 3–5 in., axillary and terminal in short dense panicles; bracts ⅜ by ¼ in., glabrous, ciliate, persistent, reticulate, scarious; bracteoles 0. *Calyx* scarcely ⅕ in., divided nearly to the base into linear segments. *Corolla* ⅓–½ in., glabrous without. *Stamens* 2, glabrous except at their point of attachment, 2 linear rudiments added. *Capsule* ⅓ in., 4-seeded. *Seeds* ovate, glistening, glabrous, hairless, without lateral areoles.

20. **S. khasyanus,** *T. Anders. in Journ. Linn. Soc.* ix. 471; hirsute, leaves ovate acuminate toothed, spines axillary clustered linear lax, bracts linear-spathulate as long as the calyx, corolla slender white. Endopogon khassyanus, *Nees in DC. Prodr.* xi. 104.

KHASIA MTS., alt. 2–4000 ft.; *Griffith, H. f. & T.*, &c. SIKKIM; Darjeeling (*Herb. Griffith*).

A shrub, 2–4 ft., densely patently brown-hairy, somewhat glandular-viscid. *Leaves* 4 by 2 in., shortly narrowed into the petiole, strongly crenate or subserrate, mature hirsute on both surfaces; nerves 9 pair; petiole 1¼ in. *Spikes* 1–4 in., forming axillary tufts of unequal length, linear but scarcely interrupted; bracts ¼–⅓ in.; bracteoles ¼ in., linear. *Sepals* ¼ in., linear, somewhat enlarged in fruit. *Corolla-tube* ½ in., linear, funnel-shaped only towards the top, lobes ¼–⅓ in., roundish, patent. *Filaments* glabrous, unless at the very base, anthers much exsert. *Capsule* ⅓ in., 4-seeded. *Seeds* ovate, with an areola on each side; hairy (except on the areoles) with adpressed hairs inelastic when wetted.

Subgenus 3. **Eustrobilanthes.** Calyx deeply subequally 5-fid. *Stamens* 4, perfect; anthers not very unequal.

Series A. *Bracteatæ.* *Bracts* prominent, persistent or only ltate deciduous. *Flowers* spiked, clustered or strobilate; spikes sometimes interrupted below, but flowers never all scattered.

* *Flowers capitate or shortly spicate.* (An artificial section passing by gradations into the strobiliform or interruptedly spicate sections.)

† *Seeds glabrous* (in a few not known).—Species of Ceylon and the Deccan Peninsula.

21. **S. barbatus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 179; leaves broad-elliptic acuminate at both ends glabrous, bracts obovate cuspidate squarrose, corolla white very hairy within, seeds usually 2. *T. Anders. in Journ. Linn. Soc.* ix. 468; *Bedd. Ic. Pl. Ind. Or.* t. 212. S. tetrapterus, *Dalz. in Hook. Kew Journ.* ii. 342; *Dalz. & Gibs. Bomb. Fl.* 187; *T. Anders. in Journ. Linn. Soc.* ix. 468. Ruellia ciliata, *Heyne in Herb. Rottler*; *Wall. Cat.* 2392 (*not Wall. Cat.* 2415).

W. DECCAN PENINSULA; from the Bombay Ghats to Cape Comorin, alt. 3000 ft., *Wight, Dalzell,* &c.

A gregarious shrub, flowering once at about 7 years old, then dying (Beddome); stem often winged. *Leaves* 7 by 3 in., crenulate or subentire, lineolate especially above; nerves 7–8 pair; petiole 1–3 in., base often auriculate, sometimes winged. *Heads* 1–2 in., sessile, very dense; bracts $\frac{3}{4}$ in., obscurely quadrifarious, green, ciliate; bracteoles $\frac{1}{2}$ in., linear, ciliate. *Calyx* $\frac{1}{3}$ in., divided more than half-way down, green, ciliolate; segments linear-lanceolate. *Corolla* $\frac{3}{4}$–1 in.; cylindric base as long as the suddenly-widened subcampanulate portion; limb nearly erect, subequal. *Filaments* sparsely hairy upwards. *Pistil* sparsely hairy and glabrous. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., clavate, always 2-seeded. *Seeds* nearly $\frac{1}{4}$ in. long, very thin, elliptic, areoles 0.—The fruit has only been seen in the form *S. tetrapterus,* Dalz. In the old examples of *S. barbatus* the corolla is barely $\frac{1}{2}$ in., the heads and bracts are smaller, the calyx less deeply divided; but Beddome says (from knowledge of the living plant) that there is only one species here.

22. **S. lanceolatus,** *Nees in DC. Prodr.* xi. 181; glabrous except the calyx, leaves lanceolate acuminate at both ends nearly entire, heads small capitate few-fld., calyx-segments in flower lanceolate acute slightly hairy in fruit, capsule 4-seeded. S. adenophorus, *Nees l. c.* 182; *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 466, *not of Beddome.* Martynia lanceolate, *Moon Cat. Pl. Ceyl.* Goldfussia Myrtinia, *Nees l. c.* 174.

CEYLON; Four Korles and Saffragam, *Macrae, Thwaites,* &c.

A small shrub; branches quadrangular. *Leaves* 3 by $\frac{3}{4}$ in., prominently lineolate above; nerves 6 pair; petiole $\frac{1}{2}$ in. *Heads* $\frac{1}{2}$ in. (exclusive of the corolla), 2–4-fld., in appearance solitary peduncled, peduncles slightly thickened upwards quadrangular or subalate; floral leaves 2, elliptic, $\frac{1}{2}$ in., in the dried examples erect, overtopping closely enveloping the flower-head; proper bract $\frac{1}{3}$ in., oblong; bracteoles 2, $\frac{1}{4}$ in., sublinear, often suppressed in the upper flowers as commonly in close heads. *Calyx* $\frac{1}{3}$ in., divided half-way down, segments in fruit elongate obtuse. *Corolla* $1\frac{1}{4}$–$1\frac{1}{2}$ in., nearly glabrous without, light-blue; cylindric nearly as long as the ventricose part. *Filaments* hairy downwards. *Ovary* hairy at the apex. *Capsule* $\frac{2}{3}$ in., narrowly oblong. *Seeds* $\frac{1}{6}$ in. long, thin, elliptic, glabrous; areoles $\frac{1}{3}$ the length of the seed.

23. **S. heteromallus,** *T. Anders. ms.*; villous, subhispid, leaves ovate acute, heads ovoid, bracts oblong overtopping the calyx, ovary densely hairy at the tip. S. scaber, Var. γ *Nees in Wall. Pl. As. Rar.* iii. 84, Var. β *Nees in DC. Prodr.* xi. 178, *as to Wight's Deccan material.* Ruellia scabra, *Wall. Cat.* 2377 (*not Wall. Cat.* 2393).

NILGHERRIES; Canoor, *Wight* (nn. 1945, 2207, herb. propr.).

A coarsely hairy shrub, resembling *S. Wightianus*. *Leaves* attaining 5½ by 3½ in. (mostly much smaller), base obtuse shortly decurrent on the petiole, nearly entire, thick, rugose, upper surface subhispid with hairs from tubercular bases, under villous; nerves 7–8 pair; petiole 1½ in. *Heads* sessile, 1 in., dense, hairy; bracts ¾–1 in., erect; bracteoles ⅝ in., sublinear. *Calyx* ½ in. or more, divided more than half-way down; segments linear-lanceolate, hairy upwards. *Corolla* 1 in., glabrous without, hairy within, subsymmetric, cylinder portion of the tube as long as the ventricose. *Stamens* 4; filaments very hairy at the base. *Ovary* dense fulvous-hairy at the tip; style sparsely hairy; ovules 4. *Capsule* scarcely ⅓ in., narrowly ellipsoid, 2- or 4-seeded. *Seeds* more than ⅛ in., glabrous; areoles 0.—This in the dry state greatly resembles *S. Wightianus*, but the ovary, style and seeds differ. Col. Beddome says the shrub is well known to him at Canoor, but has not flowered during his whole residence in the Nilgherries.

24. **S. Wightianus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 180; coarsely hairy, leaves ovate, heads ovoid, bracts elliptic-acuminate overtopping the calyx, ovary glabrous at the tip, capsule 4-seeded. *Wight Ic.* t. 1514; *T. Anders. in Journ. Linn. Soc.* ix. 466.

NILGHERRY MTS., alt. 7–8000 ft., frequent; *Gardner*, *Wight*, *Gen. Munro*, &c.

Stems 2–3 ft., stout, often almost shaggy. *Leaves* 1½–2 by 1 in., obtuse, base shortly cuneate, thick, rugose. *Bracts* ¾–1 in., acute; bracteoles ⅔ in., linear-spathulate. *Calyx* ⅝ in., divided nearly to the base; segments linear-oblong, subobtuse, softly hairy; in fruit somewhat membranous nervose. *Corolla* ¾–1 in., blueish, nearly glabrous without, with hairy lines within; cylindric base of the tube much shorter than the ventricose part. *Ovary* glabrous; style sparsely hairy. *Capsule* ⅓ in., oblong, 4-seeded. *Seeds* $\frac{1}{10}$ in. long, thin, elliptic, glabrous; areoles 0—Otherwise as the preceding species, which Wight appears to have included under *Wightianus*.

25. **S. pulneyensis,** *Clarke*; hirsute, leaves ovate shortly acute, heads subglobose abbreviated dense with foliaceous bracts, style-base patently hairy, corolla-tube with long linear-cylindric base. S. punctatus, *Bedd. Ic. Pl. Ind. Or.* t. 204 *in note, not of Nees.*

S. DECCAN; Pulney Hills and Anamallays, *Beddome*.

Resembling *S. Wightianus*, but with a differently shaped corolla. *Leaves* 3 by 2 in., base rounded or cuneate, crenate, thick, tubercular-hairy above, more softly hairy beneath; petiole 1½ in. *Heads* much depressed, as if into flattened rosettes, the rounded bracts patent on all sides; bracteoles ½–⅗ in., linear-lanceolate. *Calyx* ½–⅗ in., divided more than half-way down; segments linear-lanceolate, hairy. *Corolla* 1 in., somewhat hairy in the bud; cylindric base as long as the ventricose part. *Filaments* glabrous, except at the base. *Ovary* slightly patently hairy towards the apex, 4-ovulate. *Capsule* not seen.—Communicated by Col. Beddome as probably Ruellia ? punctata of Wight, which differs very considerably. In the absence of seeds, it is placed by guess next *S. Wightianus*.

26. **S. neilgherrensis,** *Bedd. Ic. Pl. Ind. Or.* t. 196; hirsute, subhispid, leaves large ovate acuminate, heads ovoid, bracts narrow-oblong, bracteoles and calyx-segments in fruit elongate caudate patently bristly, capsule 4-seeded.

S. DECCAN, common in the mountains, Nilgherries, Pulneys, Coorg, &c., *Beddome*.

A shrub, general aspect of *S. Perrottetianus*. *Leaves* 6 by 3½ in., base obtuse, crenate, coarsely hispid with white or yellow hairs from tubercular bases; nerves 8 pair; petiole 1–2 in. *Heads* sessile, capitate, not elongate even in fruit; bracts 1 by ⅙ in.; bracteoles at flower-time ½ in., linear, in fruit elongate very long-tailed. *Sepals* ⅓ in.; in fruit at least 1 in., base lanceolate with leaden glabrous scarious margins.

Corolla 1¼–1½ in., glabrous without, white (Beddome), cylindric base nearly as long as the urceolate part. *Filaments* hairy, especially downwards. *Style* sparsely patently hairy. *Capsule* ⅝ in., oblong ellipsoid. *Seeds* thin, obovate, obtuse, glabrous; areoles 0.—Beddome says "ovary very hairy at the apex," but in his figure and specimens it is very slightly so. Possibly the note applied to *heteromallus*?

27. **S. Perrottetianus,** *Nees in DC. Prodr.* xi. 179; rufous-hirsute, leaves ovate acuminate, heads ovoid or subclavate, bracts ovate acute overtopping the calyx, capsule 2-seeded. *Wight Ic.* t. 1513; *T. Anders. in Journ. Linn. Soc.* ix. 466.

NILGHERRY MTS., alt. 6–8000 ft., frequent; *Wight*, &c.

Stem 2–3 ft. *Leaves* 4½ by 2½ in. (often smaller), base broadly rhomboid, crenate; nerves 7 pair; petiole 1½ in. *Heads* 1–2 in., often wider upwards, or substrobiliform, hirsute, in appearance peduncled or panicled, but the two outermost bracts are empty, and more or less leafy; bracts ¾ in.; bracteoles ⅓ in., linear. *Calyx* ¾ in., divided ⅔ the way down, subscarious with numerous red hairs; segments sublinear, acute. *Corolla* 1 in., pale-lilac, subsymmetric; narrow portion of the tube short; glabrous without. *Filaments* hairy. *Ovary* glabrous; base of style patently hairy. *Capsule* ½ in., oblong-ellipsoid, 2-seeded. *Seeds* ¼ in. long and upwards, very thin, ovate, not hairy, but minutely scabrous-lamellate; areoles 0.

28. **S. Zenkerianus,** *T. Anders. in Journ. Linn. Soc.* ix. 467; glabrous except the fruiting calyx-tips, leaves ovate shortly acuminate, spikes ovoid or oblong, bracts narrowly elliptic-oblong overtopping the calyx, capsule 4-seeded. Goldfussia Zenkeriana, *Nees in DC. Prodr.* xi. 172. G. Leschenaultiana, *Nees l. c.* ?. Endopogon Strobilanthes, *Wight Ic.* t. 1500.

NILGHERRY MTS., alt. 6–8000 ft., frequent; *Sir F. Adam, Schmidt, Wight,* &c.

A shrub, 2–3 ft., much resembling *S. foliosus* (n. 8), and really closely allied to it. *Leaves* 3 by 1¾ in., base cuneate, serrulate, upper surface prominently lineolate; nerves 7 pair; petiole 1½–2 in. *Spikes* 1–2½ in., young globose or oblong, mature oblong; bracts ¾ in.; bracteoles ⅝ in., sublinear. *Calyx* ½–⅔ in., divided nearly to the base; segments linear-lanceolate, glabrous or in the fruiting examples with scattered patent gland-tipped hairs. *Corolla* 1½ in., blueish, glabrous without; cylindric nearly as long as the ventricose part. *Filaments* hairy in their lower half. *Pistil* glabrous or nearly so. *Capsule* ½ in., oblong-ellipsoid. *Seeds* ⅓ in. long, very thin, elliptic, glabrous; areoles 0.

29. **S. warreensis,** *Dalz. in Hook. Kew Journ.* ii. 341; leaves broad-lanceolate acuminate at both ends glabrous, spikes oblong hairy, calyx greatly enlarged in fruit, corolla ½ in., capsule 4-seeded. *Dalz. & Gibs. Bomb. Fl.* 187. S. ciliatus, *T. Anders. in Journ. Linn. Soc.* ix. 468, *partly.* S. parviflorus, *Bedd. Ic. Pl. Ind. Or.* t. 197.

W. DECCAN PENINSULA; near Belgaum, Warree country, *Dalzell*; Ram Ghaut, *Ritchie*; Coorg and S. Canara, alt. 3000 ft., *Beddome*.

Shrub, 2–5 ft. *Leaves* 6 by 2 in., much acuminate, crenate, lineolate on both surfaces; nerves 7 pair; petiole ⅝ in. *Spikes* 1–2 in., peduncles hairy, erect in fruit; bracts (flowering) ¼–⅓ in., elliptic, hairy; bracteoles ¼ in., linear. *Calyx* (flowering) ¼ in., divided nearly to the base; segments linear pubescent upwards. *Corolla* straight, nearly symmetric, glabrous, linear-cylindric about as long as the subcampanulate portion; white purple-spotted. *Filaments* hairy below, not more monadelphous than in many other species. *Pistil* glabrous. *Capsule* ½ in., clavate-oblong; fruit-sepals ¾ in., narrowly oblong, hairy. *Seeds* ⅓ in. long, thin, elliptic, glabrous; areoles 0.—The extraordinary enlargement of the calyx in fruit was noted by Dr. Ritchie, whose examples have flowering and fruiting spikes on the same branch.

30. **S. ciliatus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.*

xi. 183; glabrous, leaves broad-lanceolate acuminate at both ends, spikes small oblong often deflexed at flower-time, corolla small. *T. Anders. in Journ. Linn. Soc.* ix. 468, *partly*; *Bedd. Ic. Pl. Ind. Or.* t. 211. Ruellia ciliata, *Wall. Cat.* 2415 (*not Wall. Cat.* 2392). Goldfussia Zenkeriana, *Wight Ic.* t. 1517?, *not of Nees*.

S. DECCAN PENINSULA; the Ghauts up to 4000 ft., common, *Beddome*; Nilgherries, Mangalore, &c., Courtallum, *Wight* (n. 1949, Herb. Propr.).

Resembling *S. warreensis* in leaves and spikes; but the peduncles and bracts are perfectly glabrous, the spikes slenderer. *Corolla* in the dried examples ½–⅔ in.; Wight's figure shows them very much too large; Beddome figures (and describes) them an inch, but his description appears largely taken from *S. warreensis*.

31. **S. adenophorus,** *Bedd. Ic. Pl. Ind. Or.* t. 225, *not of Nees nor of T. Anders.*; glabrous, leaves lanceolate acuminate at both ends subentire, heads oblong, bracts obovate, calyx-segments lanceolate subobtuse.

S. DECCAN; Anamallay Mts., alt. 4–5000 ft., *Beddome.*

Shrubby, 3–4 ft. *Leaves* 4 by 1 in., conspicuously lineolate above; nerves 6 pair, slender; petiole ½ in. *Heads* 1–2 in., often deflexed; bracts ⅓–½ in., obtuse, sometimes mucronate, glabrous, lineolate; bracteoles ¼ in., narrowly ligulate. *Calyx* nearly ½ in., divided about half-way down; segments membranous. *Corolla* 1–1¼ in., glabrous without, very hairy within, nearly straight; cylindric rather shorter than the urceolate part. *Filaments* hairy downwards. *Pistil* glabrous. *Capsule* not seen.—Beddome says that T. Anderson identified this plant with the Ceylon *S. lanceolatus,* but there must have been some mistake, as except in the leaves there is little resemblance between the two. In its habit, deflexed peduncles, and bracts, this seems very nearly allied to *S. ciliatus,* Nees, but in the absence of seeds it is hazardous to guess at affinity.

32.? **S. decurrens,** *Nees in DC. Prodr.* xi. 189; glabrous, leaves elliptic acuminate at both ends, spikes clavate-oblong, bracts large narrowly elliptic obtuse decurrent. S. pallidus, *T. Anders. in Journ. Linn. Soc.* ix. 470. Goldfussia decurrens, *Wight Ic.* t. 1522 (not Endopogon decurrens, Nees).

S. DECCAN; Coimbatore, Courtallum and Nilgherries, *Wight*; Anamallays, *Beddome.*

Herbaceous (fide Wight), green. *Leaves* 7 by 2½ in., entire or obscurely crenate, conspicuously lineolate above; nerves 10 pair; petiole 1 in. *Peduncles* 1–2 in., slightly thickened upwards, quadrangular or subalate, divaricate or deflexed, often with 2 bract-like leaves below the head; heads 1½ in., tapering at the base; bracts 1 by ⅓ in. bracteoles ⅓ in., linear-ligulate. *Calyx* ⅓ in., subscarious, divided more than half-way down, segments lanceolate. *Corolla* 1¼ in., glabrous without; cylindric portion scarcely so long as the ventricose. *Filaments* hairy downwards. *Pistil* glabrous. *Capsule* not seen.—This species is placed here from its similarity to *S. ciliatus* and *S. adenophorus.*

†† *Seeds hairy.*

¶ *Species of the Deccan Peninsula and Ceylon.*

33. **S. Walkeri,** *Nees in DC. Prodr.* xi. 181; nearly glabrous, leaves broadly elliptic acuminate at both ends, spikes ovoid few-fld. cymose, bracts ovate adnate obtuse bullate, capsule with 2 very large seeds. *Bedd. Ic. Pl. Ind. Or.* t. 222; *T. Anders. Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470.

CEYLON; alt. 4–7000 ft., *Walker,* &c.

A shrub, 6 ft., gregarious, flowering when about six years old, then dying. *Leaves* 6½ by 2¾ in., crenate, minutely sparsely scabrid-pubescent; nerves 7–8 pair; petiole

1½ in. *Cymes* often of 3 heads, sometimes compound; peduncles clavellulate or winged; heads ⅜ in., 2–4 fld., enveloped by the two outer bract-like erect leaves; proper bracts ½ in., green, slightly ciliate; bracteoles ¼ in., sublinear. *Sepals* ⅓ in., linear-lanceolate, obtuse, scarious, nearly glabrous. *Corolla* ¾ in., subsymmetric, glabrous without, hairy within, white or purplish; contracted base short. *Filaments* hairy at the base. *Pistil* glabrous. *Capsule* ⅜ in., ellipsoid. *Seeds* nearly ⅛ in., very thin, ovate, shaggy with adpressed wavy silky hair not elastic in water; areoles 0.—Beddome's figure shows the corolla within and filaments glabrous, which they may be sometimes, for it is not a very constant character in *Strobilanthes*; but none of the numerous specimens are so.

VAR. ? *stenocarpa*; leaves broadly ovate pubescent beneath somewhat flaccid, capsules ⅓ in. 2-seeded, seeds ⅕ in. shaggy with silky hair, areoles hardly any.—Ceylon; Thwaites, C. P. n. 3517. This probably differs specifically from *S. Walkeri*, the difference in the size of the fruit being startling; but it must stand next to it.

34. **S. Thwaitesii,** *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate at both ends scabrous pubescent beneath, spikes oblong few-fld. cymose, bracts sessile elliptic elongate acute bullate. *Bedd. Ic. Pl. Ind. Or.* t. 219.

CEYLON; Ambagamowa, *Thwaites.*

A shrub, 4–5 ft. *Leaves* 6½ by 2¼ in., crenulate, subcoriaceous, mature glabrate above fuscous pubescent beneath; nerves 7 pair; petiole 1¼ in. *Peduncles* fascicled or cymose, thickened upwards, more or less pubescent; outermost empty bracts ¼ in., ovate; bract proper nearly 1 in., ciliate; bracteoles ½ in., linear. *Calyx* ½ in., divided ⅝ the way down; segments narrowly lanceolate, ciliate. *Corolla* exceeding 1 in., subsymmetric, white, glabrous without, hairy within; linear-cylindric base of the tube hardly so long as the campanulate part. *Filaments* and *style* sparsely hairy. *Capsule* not seen.

35. **S. caudatus,** *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 470; leaves lanceolate caudate-acuminate fuscous-pubescent beneath, heads oblong fuscous-villous, bracts oblong, corolla nearly glabrous within. *Bedd. Ic. Pl. Ind. Or.* t. 213.

W. DECCAN PENINSULA; S. Canara, 2–6000 ft., *Beddome*; common also in Koorg and Wynaad, fide Beddome. CEYLON; Hantani, *Thwaites* (C. P. n. 364).

A shrub, 4–5 ft. *Leaves* 6 by 1¾ in., base tapering, subentire, mature glabrate lineolate above; nerves 10–12 pair; petiole ½ in. *Peduncles* 1–2 in., hairy, divaricate, carrying 1–3 nodding spikes ½–1½ in. long; bracts ½ in., oblong; bracteoles ⅓ in., narrowly oblong. *Calyx* nearly ½ in., oblong, softly brown-hairy, divided nearly to the base; segments sublinear, obtuse. *Corolla* ¾–1 in., nearly glabrous, white tinged orange or reddish; cylindric portion shorter than the ventricose; limb suboblique, segments short round. *Filaments* glabrous. *Ovary* scabrous, slightly glandular-hairy; style thinly hairy. *Capsule* ⅜ in., broadly ellipsoid, fuscous-pubescent, 2-seeded. *Seeds* ¼ in. diam., rufous, inelastically shaggy; areoles small.—Col. Beddome's Malabar plant has rather longer hairs on the stem and leaves than the Ceylon.

VAR. *laniceps*; tips of the branchlets purple, peduncles and spikes densely white with patent hairs ⅛–¼ in. long, corolla 1¼ in. very hairy within, filaments hairy.—Ceylon; *Thwaites.*—Sent by Thwaites, numbered 364, subsequently to the rest of n. 364, and probably not seen by T. Anderson before Thwaites' Enum. was published.

36. **S. tristis,** *T. Anders. in Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate at both ends nearly glabrous, heads oblong 2–3-fld. panicled, bracts elliptic acuminate overtopping the densely hairy calyx-teeth, capsule 2-seeded. Goldfussia tristis, *Wight Ic.* t. 1508.

NILGHERRIES; *Gardner*; below Sispara, *Wight.* S. TINNEVELLY; *Beddome.*

An erect shrub. *Leaves* 7 by $2\frac{1}{2}$ in., crenate, lineolate on both surfaces; nerves 6–7 pair beneath, minutely scabrid; petiole 2 in. *Heads* several (sometimes 35) to the panicle; panicle branches slender, glabrescent; outermost pair of pollen bracts usually $\frac{1}{4}$ in., lanceolate, next pair resembling the proper bracts but empty, patently glistening hairy or quite glabrous; bract proper $\frac{3}{4}$ in., sessile, green; bracteoles 0. *Sepals* nearly $\frac{1}{2}$ in., linear, scarious below, terminating in a dense tuft of multicellular hairs. *Corolla* 1 in., subsymmetric, pale-blue, hairy within; ventricose portion longer than the contracted; segments round. *Filaments* hairy towards the base. *Style* sparsely hairy. *Capsule* $\frac{1}{2}$ in., narrowly ellipsoid. *Seeds* $\frac{1}{4}$ in., thin, subquadrate elliptic, shaggy with adpressed wavy silky hair not elastic when wetted, glabrous on the oblong large areoles.

37. **S. anceps,** *Nees in DC. Prodr.* xi. 189; thinly hairy, leaves ovate acuminate, heads small oblong, bracts obovate obtuse tips green squarrose or reflexed. *T. Anders. in Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 204.

CEYLON; alt. 3–6000 ft., frequent, *Gardner*, &c.

A small undershrub, much branched. *Leaves* 3 by $1\frac{1}{4}$ in., obtuse or acuminate at the base, subentire, with scattered hairs and occasionally a few red glands beneath; nerves 6 pair; petiole $\frac{1}{3}$ in. *Peduncles* 0–$1\frac{1}{2}$ in., numerous, often in clusters of 3, thickened upwards, 1-headed; heads $\frac{1}{2}$ in., ovoid, in fruit often 1–2 in. oblong; bracts $\frac{1}{4}$–$\frac{1}{2}$ in., adpressed downwards often densely red, glandular, tips prominently reflexed; bracteoles $\frac{1}{4}$ in., linear. *Calyx* $\frac{1}{4}$ in., divided nearly to the base; segments linear, thin, hairy, much enlarged in fruit. *Corolla* $\frac{3}{4}$ in., slightly pubescent without, slightly hairy within, straight, subsymmetric, white; contracted base much shorter than the urceolate portion, segments rounded. *Filaments* with long hairs. *Ovary* densely glandular at the tip, style glabrous. *Capsule* $\frac{1}{3}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovoid, closely hairy with short thick annulate hairs, elastically springing out when wetted.

VAR. *microstachya*; leaves and heads more hairy less glandular, calyx very small, corolla more hairy without. S. macrostachya, *Benth. in Flora* 1849, 557. Ruellia? punctata, *Nees in DC. Prodr.* xi. 147; *Wight Ic.* t. 1563.—Hills of S. Deccan; Courtallum, *Wight*; Mangalore, *Hohenacker*, n. 463; Anamallays, *Beddome*. Leaves 5 in.; filaments nearly glabrous. Beddome says that this plant is "very scabrous, the hairs arising from harsh papillæ." Wight's figure of *Ruellia? punctata* is drawn from his Herb. Propr. n. 656, preserved at Kew, written up by Wright, and quoted by Nees; but it is a particularly softly hairy form. As Beddome remarks, it is not taken up by T. Anderson.

VAR.? *punctata*, T. Anders. in Thwaites Enum. 229; leaves small ovate glabrous densely glandular beneath, bracts orbicular glabrous ciliated densely glandular tips not reflexed. Strobilanthes punctatus, *Nees in DC. Prodr.* xi. 182 (sp.), *not of Bedd.*—Ceylon; *Walker*. Leaves $\frac{1}{2}$–$1\frac{1}{4}$ in., subobtuse, base often subcordate. Perhaps specifically distinct, but there is only one example, without fruit, named by Nees.

38. **S. Arnottianus,** *Nees in DC. Prodr.* xi. 179; softly laxly hairy, leaves cordate-ovate acute, heads obovoid nodding, bracts ovate acuminate, corolla subcampanulate lobes somewhat acute. *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 261.

CEYLON; Newera Ellia, *Walker*, &c.

An undershrub, branches hirsute upwards. *Leaves* 4 by 2 in., crenate-serrate, thinly hairy on both surfaces; nerves 4–5 pair; petiole 1–2 in. *Heads* $\frac{1}{2}$–1 in., white-hairy; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., sessile; bracteoles $\frac{1}{3}$–$\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., divided nearly to the base; segments linear-lanceolate. *Corolla* $\frac{2}{3}$ in., straight, symmetric, almost funnel-shaped from the very short contracted base, slightly hairy within and without, whiteish. *Filaments* attached very low down the corolla, glabrous; anthers exserted. *Ovary* and *style* hairy. *Capsule* 4-seeded; seeds (unripe) hairy.

—The segments of the corolla are ovate, longer and much more acute than in Beddome's figure.

39. **S. asperrimus,** *Nees in DC. Prodr.* xi. 183; leaves broadly elliptic acuminate at both ends hairy, heads panicled, bracts elliptic concave glabrous, bracteoles 0. S. lupulinus, *T. Anders. in Journ. Linn. Soc.* ix. 469, *partly.* S. Hookeri Var. *β*, *Nees l. c.* 185.

CEYLON; *Walker, Gardner,* &c.

Apparently a large shrub; branches swollen at the joints, scabrous, hirsute upwards. *Leaves* 9 by 4 in., crenate; nerves 11 pair; petiole 1½ in. *Panicles* in Walker's examples very compound; heads 1–1½ in., broadly oblong; bracts ⅝ in. *Calyx* less than ½ in., divided nearly to the base; segments ligulate, scarious, lineolate. *Corolla* ¾ in., little contracted below, subsymmetric, glabrous without, hairy within. *Capsule* ½ in., 4-seeded. *Seeds* ⅛ in., thin, suborbicular, densely elastically hairy on the margin, areoles very large extended over all the seed but the margin.

40. **S. trifidus,** *Nees in DC. Prodr.* xi. 185; nearly glabrous, leaves elliptic acuminate, heads globose solitary or in small cymes, bracts ovate or elliptic concave, bracteoles 0. S. tener, *Nees l. c.* 184. S. coloratus, *Nees l. c.* 86, *not of T. Anders.* S. lupulinus, *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 469, *partly.*

CEYLON, frequent; *Gardner,* &c.

Regarded by T. Anderson as a glabrescent form of *S. asperrimus,* which it may be, but the capsule is unknown and the inflorescence much less compound. *Leaves* 3–10 in., base attenuated or rounded, drying black. *Bracts* membranous, the upper even in the young heads often coloured membranous.

41. **S. lupulinus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 184; hairy, leaves elliptic acuminate at both ends, spikes in small dense cymes, bracts elliptic obtuse concave softly hairy, bracteoles obsolete. S. Dalzellii, *T. Anders. ms. in Herb. Kew.* Ruellia lupulina, *Wall. Cat.* 2355 *a & c.*

W. DECCAN PENINSULA; Concan, *Dalzell, Stocks*; Ram Ghaut near Belgaum, *Ritchie.* COURTALLUM; *Wight.*

Branches stout, woody, hairy upwards. *Leaves* 6 by 2–3 in., denticulate, laxly villous on both surfaces or subsetulose above; nerves 8 pair; petiole 1¾ in. *Peduncles* axillary, very short; spikes 1½ in., oblong, subumbellate or solitary; bracts ⅔–1 in. *Calyx* ¼–⅓ in., divided nearly to the base; segments ligulate, obtuse, scarious, glabrous, tips bristly. *Corolla* ¾–1 in., glabrous without, hairy within, straight, subsymmetric; cylindric part as long as the suburceolate, lobes short. *Filaments* hairy downwards. *Pistil* glabrous or the style upwards microscopically hairy. *Capsule* scarcely ⅓ in., oblong, 4-seeded. *Seeds* ⅛ in., elliptic, elastically white hairy only on the very margin.—The Bombay botanists took this species for a hairy-bracteate form of *S. rugosus* (Wight Ic. t. 1619).

42. **S. Heyneanus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 184; leaves broadly elliptic acuminate at both ends hairy, spikes subglobose cymose, bracts elliptic ventricose glabrous, bracteoles 0, corolla ¾ in. *Dalz. & Gibs. Bomb. Fl.* 187. S. rugosus, *Wight Ic.* t. 1619. S. lupulinus, *T. Anders. in Journ. Linn. Soc.* ix. 469, *partly.* Ruellia bracteata, *Heyne in Herb. Rottler*; *Wall. Cat.* 2357, *type sheet only, not* Goldfussia bracteata, *Nees.*

W. DECCAN PENINSULA from the Bombay Ghats to the Bababooduns and Nilgherries; *Heyne, Wight, Dalzell,* &c.

Stems never exceeding 18 in. high (Dalzell, Stocks), hirsute upwards. *Leaves* 6 by 2¾ in., closely serrate, tubercular-hairy above, softly hairy beneath, drying green

(not black); nerves 7 pair; petiole 2 in. *Peduncles* short or 0; spikes 1–1½ in.; bracts ⅔ in., ventricose, membranous. *Calyx* ⅓ in., divided nearly to the base; segments ligulate, subobtuse, membranous, lineolate. *Corolla* glabrous without, hairy within, pale blue; contracted portion scarcely shorter than the ventricose; limb equal, segments round. *Filaments* and *style* hairy. *Capsule* scarcely ⅓ in., oblong, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovoid, glabrous except on the very margin.

VAR.? *campanulata*; leaves ovate subacute hairy, spikes subglobose solitary or few together, bracts elliptic ventricose glabrous, bracteoles 0, corolla scarcely ½ in. S. campanulata, *Wight Ic.* t. 1562. S. involucratus Var. *β, Nees in DC. Prodr.* xi. 184. S. lupulinus, *T. Anders. in Journ. Linn. Soc.* ix. 469, *partly.* Ruellia lupulina, *Wall. Cat.* 2355 b, *partly.*—Coorg; *Wight.*—Plant 5–10 in. *Leaves* 1–2 in., drying green. *Heads* ½–1 in. *Corolla* subcampanulate; lobes very short. *Capsule* less than ⅓ in., seeds glabrous. Possibly an alpine var. of *S. Heyneanus,* but the corolla is a different shape, as well shown in Wight's figure. The example of *Wall. Cat.* 2355 *b* in his own Herb. is nearer *S. Heyneanus,* Nees, type; that in Herb. Hook. agrees closely with Wight's *campanulatus.*

VAR. ? *fusca*; leaves broadly elliptic acuminate at both ends very sparsely hairy, heads globose nodding mostly solitary, bracts broadly elliptic ventricose glabrous, bracteoles 0. S. lupulinus, *Benth. in Pl. Hohenack.* n. 814; *T. Anders. in Journ. Linn. Soc.* ix. 469 *partly, not of Nees.*—Mercara in Canara, *Hohenacker. Branches* 15 in., nearly glabrous. *Leaves* 5 by 2¼ in., somewhat black in drying, densely lineolate on both surfaces, very minutely sparsely hairy. *Heads* 1–1½ by ¾–1 in.; bracts and calyx as of *S. Heyneanus. Corolla* not known.

VAR. *viridis*; stem stout rough, leaves 1–3 in. very scabrous, heads small bracts (at flower-time) closely adpressed. S. asperrimus, *Dalz. & Gibs. Bomb. Fl.* 187, *not of Nees.*—Strobilanthes sp. n. 32, *Herb. Ind. Or. H.f. & T.*—Mysore; *G. Thomson.* —The specimens do not match those of *S. lupulinus,* but Col. Beddome after seeing them says it is that species.

43. **S. ixiocephalus,** *Benth. in Flora* 1849, p. 557; leaves lanceolate or elliptic acuminate slightly hairy, heads ovoid closely cymed, bracts elliptic acuminate to an obtuse apex viscous hairy. *Bedd. Ic. Pl. Ind. Or.* t. 203. S. Neesianus, *Wight Ic.* t. 1523; *Dalz. & Gibs. Bomb. Fl.* 188. S eriocephalus, *T. Anders. in Journ. Linn. Soc.* ix. 466.—Strobilanthes sp. n. 64, *Herb. Ind. Or. H.f. & T.* S. glutinosus, *Grah. Cat. Pl. Bomb.* 162 ?.

W. DECCAN PENINSULA and S. MADRAS, alt. 1–3000 ft., frequent; *Wight, Hohenacker,* &c.

A small shrub. *Leaves* 5 by 2 in., or oftener smaller narrower, base cuneate (sometimes very shortly), crenate, mature nearly glabrous, conspicuously lineolate above; nerves 7 pair; petiole ¾ in. *Heads* ½–1½ in., bracts and calyx enlarged in fruit, usually very glutinous, sometimes softly hairy; bract ⅔ by ⅓ in.; bracteoles ⅓ in., linear-spathulate. *Calyx* ⅓–½ in., divided nearly to the base; segments ligulate, fruiting spathulate, obtuse, membranous. *Corolla* ¾–1 in., glabrate without, hairy within, subsymmetric, white; cylindric portion nearly as long as the ventricose. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* ½ in., often 2-seeded. *Seeds* ⅙ in., thin, ovate, densely elastically hairy on all sides; areoles very small.

44. **S. micranthus,** *Wight Ic.* t. 1519; leaves ovate acuminate sparsely thinly pubescent, heads solitary ovoid nodding, bracts broadly lanceolate pubescent, bracteoles longer corolla shorter than the calyx. *T. Anders. in Journ. Linn. Soc.* ix. 468.

NILGHERRY MTS.; *Wight.*

Suffruticose or herbaceous (Wight), erect; stems glabrous. *Leaves* 6 by 3½ in., base broad, shortly decurrent, closely serrate; nerves 11 pair; petiole 1½ in. *Heads* 1½–2½ in.; bracts 1 in., widest close to the base, thinly herbaceous; bracteoles ¾ in., linear-lanceolate. *Calyx* ½–⅔ in., divided nearly to the base; segments linear-lanceolate, very acute, pubescent. *Corolla* ½ in., subcampanulate, dry appearing dull red; lobes very short, round. *Filaments* glabrous; anthers exserted. *Pistil* glabrous.

Capsule unknown.—This imperfectly known species may very possibly have its true position nearer to *S. Heyneanus* var. *campanulata.*

45. **S. scrobiculatus,** *Dalz. ms.*; leaves elliptic acuminate at both ends nearly glabrous, spikes numerous subsessile along the naked branches, corolla 1 in. blue.

BOMBAY GHAUTS; *Dalzell*; Mahabeleshwur, *Ralph.*

Woody *branches* elongate, much divided, leafless, covered with flowers, tips leafy. *Leaves* 3 by 1 in., nearly entire; nerves 7 pair; petiole $\frac{1}{2}$ in. *Spikes* 1 in., subsessile, viscous hairy; bracts $\frac{1}{4}$ in., narrowly obovate, persistent in fruit; bracteoles $\frac{1}{3}$ in., sublinear. *Calyx* $\frac{1}{2}$ in., divided nearly to the base; segments linear, hairy. *Corolla* symmetric, nearly glabrous, pale below, a beautiful blue upwards; ventricose part rather narrow longer than the contracted; lobes ovate, crenulate. *Stamens* included, glabrous. *Style* with a few hairs. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{10}$ in., thin, ovate, densely covered with fine long hairs, elastic when wet, except the small areoles.—Appears to be the most beautiful species of the genus; it is allied to *S. ixiocephalus.*

46. **S. papillosus,** *T. Anders. in Journ. Linn. Soc.* ix. 468; scabrous hispid, leaves ovate acute, heads ellipsoid, bracts elliptic elongate scabrous hispid, corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 201. S. scaber, Var. ? *β*, *Benth. in Pl. Hohenack.* n. 1431.

NILGHERRY MTS.; alt. 7000 ft., *Hohenacker, Beddome.* MYSORE; *Lobb.*

A large shrub (Beddome); branches very harshly scabrous. *Leaves* $2\frac{3}{4}$ by $1\frac{3}{4}$ in., obtuse, base very shortly cuneate, callous-dentate, hispid with tubercle-based hairs above, setulose beneath; nerves 6 pair; petiole $\frac{3}{4}$ in. *Heads* $1\frac{1}{2}$–2 in., strictly capitate; peduncles thickened upwards, acutely 4-angled, very harshly scabrous; floral leaves 2 in., empty, overtopping the head; bract very rigid; bracteoles 1 in., narrowly lanceolate, membranous, ciliate. *Calyx* divided nearly to the base; segments $1\frac{1}{4}$ in., linear-lanceolate, very acute, membranous, ash-coloured, ciliate. *Corolla* subsymmetric, nearly glabrous, blueish; cylindric part hardly so long as the ventricose; lobes ovate. *Stamens* glabrous, included. *Pistil* thinly hairy. *Capsule* unknown.—Allied to *S. Perrottetianus* according to Beddome, and it may turn out so to be when the seeds are known.

47. **S. exsertus,** *Clarke*; leaves petioled ovate acute at both ends scabrid-pubescent, spikes densely capitate solitary terminal, bracts obovate as long as the calyx, corolla $\frac{3}{4}$ in., anthers exsert. Stenosiphonium zeylanicum, Var. *a*, *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* ix. 463.

CEYLON; *Thwaites* (C. P. 3577); Damboul, *Beckett.*

A shrub, 1–2 ft., creeping, rooting; branches suberect, quadrangular, pubescent. *Leaves* $1\frac{3}{4}$ by $\frac{3}{4}$ in., crenate, rather harsh, lineolate on both surfaces, sparsely setose above, more softly beneath; nerves 5–6 pair; petiole $\frac{1}{2}$ in. *Heads* sessile between 2 somewhat enveloping leaves; quasi-peduncles 0–$1\frac{1}{2}$ in., often thickened upwards; bracts $\frac{1}{3}$ in., subobtuse, green, persistent, patently white-hairy. *Calyx* $\frac{1}{3}$ in., divided about half-way down at flower-time, teeth lanceolate, hairy. *Corolla* curved, nearly glabrous without; cylindric base $\frac{1}{3}$ in., funnel-shaped part nearly as long; lobes ovate. *Filaments* glabrous except at the base, 2 longer distinctly exserted; anthers all subequal. *Ovary* glabrous, tip glandular, 4-ovulate; style glabrous, stigma simple. *Capsule* $\frac{1}{2}$ in., oblong, glabrous, 4-seeded from near the base. *Seeds* $\frac{1}{8}$ in. diam., much compressed, orbicular, densely elastically hairy, except on the conspicuous areoles.—Placed in *Stenosiphonium* by T. Anderson, and regarded as a var. of *Hemigraphis venosa.* The inflorescence does not do for *Stenosiphonium,* nor the leaves, and the ovules are never more than 4 to the ovary.

VAR. *β integra,* T. Anders. l. c.; leaves entire glabrous, corolla 1 in. ventricose, constricted cylindric base of the tube short.—Ceylon; *Thwaites* (C. P. n. 3661).

The only scrap of this does not permit of dissection; it can hardly be conspecific with *S. exsertus*, but may not be congeneric; it closely resembles *S. lanceolatus.*

48. **S. Gardnerianus,** *T. Anders. in Thwaites Enum.* 226; hairy, leaves sessile ovate, spikes ovoid or interrupted at base, bracts and bracteoles longer than the calyx, corolla 1 in. purple, anthers included. Endopogon Gardnerianus, *Nees in DC. Prodr.* xi. 723.

CEYLON; *Gardner, Thwaites.*

Shrubby, 1–2 ft.; stems terete, scabrous below, white-hirsute upwards. *Leaves* 2 by 1¼ in., acute or subobtuse, base rounded, subcrenate. *Spikes* capitate, ¾ in., nearly enclosed by bracts, few-fld., or lower axillary flowers being added becoming interrupted, linear-oblong; bracts ⅔ in., ovate; bracteoles ½ in., linear-oblong. *Calyx* ⅓ in., slightly hairy. *Corolla-tube* linear-cylindric below, suddenly inflated upwards, as of *Stenosiphonium. Capsule* and *seeds* unknown: hence the place of this species is uncertain; some of the examples might, so far as the inflorescence is concerned, be placed next *S. sexennis* among the Series D. "Paniculatæ."

¶¶ *Species of N. India and the Malay Peninsula.*

49. **S. scaber,** *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 177, *partly*; leaves elliptic or obovate acuminate scabrous or ultimately glabrate, spikes dense often clustered, bracts lanceolate large hairy, corolla ¾–1 in. yellow very hairy within. *Bot. Reg.* xxvii. t. 32; *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 467, *partly*. Ruellia scabra, *Wall. Cat.* 2393, *not Wall. Cat.* 2377. R. aspera, *Nees in DC. Prodr.* xi. 147, *as to the Bengal material.* R. crispa, *Herb. Linn. Propr.*

N. and E. BENGAL PLAINS; Silhet, *Wallich*; Purneah, *J. D. H.*; Maldah, Mymensingho, Dacca, &c., *Clarke.*—DISTRIB. Burma.

Stems 1–3 ft., pubescent or hairy upwards. *Leaves* 4½ by 2 in., base narrowed, crenate, sometimes very coarsely scabrous-subhispid, sometimes nearly smooth but hard; nerves 7–8 pair; petiole ¾ in. *Spikes* 1–2 in., hairy; bracts 1 by ½ in., obtusely acuminate, green; bracteoles ½ in., linear-oblong. *Calyx* ½–⅓ in., divided nearly to the base; segments linear, pubescent. *Corolla* symmetric, glabrous; cylindric base nearly as long as the ventricose portion; lobes rounded. *Stamens* included; filaments hairy towards the base. *Ovary* glandular at the apex, always 4-ovulate; style nearly glabrous. *Capsule* nearly ½ in., 4-seeded. *Seeds* $\frac{1}{12}$ in. diam., discoid; numerous fine hairs near the margin, elastic when wet; areoles very large, glabrous.—This is only *S. scaber*, Nees, in so far as that includes *Ruellia scabra*, Wall.; Nees' description (purple flowers, &c.) is totally different. *S. scaber* only occurs in Ceylon as a cultivated plant, according to Thwaites and Beddome.

50. **S. phyllostachyus,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 75; leaves elliptic or obovate acuminate scabrous, spikes dense often in close cymes, bracts large elliptic with a ligulate apex softly hairy, corolla ¾–1 in. yellow somewhat hairy within. S. crispus, *T. Anders. in Journ. Linn. Soc.* ix. 467, *not of Blume.*

PEGU; *Kurz.* MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

Herbaceous, 2–3 ft.; stems glabrate. *Leaves* 4–9 in.; petiole 2 in. *Spikes* nearly as of *S. scaber*; bracts 1 in., ligulate tips often recurved; bracteoles ⅓–½ in., linear. *Calyx* ⅓–½ in., divided nearly to the base; segments linear silky. *Corolla* nearly as of *S. scaber. Capsule* ½ in., 4-seeded; seeds ⅛–⅙ in., thin, ovate, with dense long elastic hairs on all sides except the small areoles.—So like *S. scaber* (except the seeds) that it is difficult to distinguish it.

VAR. *dura*; leaves smaller bracts narrowed upwards without ligulate tip.—Strobilanthes sp. n. 14, *Herb. Ind. Or. H. f. & T.*—Chittagong; Seetakoond, *H. f. & T.* Rangoon; *M'Lelland.* T. Anderson refers this to *S. scaber* (in *Journ. Linn. Soc.* ix. 467), which the bracts resemble; he subsequently saw it was different, and wrote it up

as *S. durus, T. Anders. sp. nov.*; from the imperfectly ripe seeds it is either a var. of *S. phyllostachyus*, or a new species very closely allied to it.

51. **S. fimbriatus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 180, *not of T. Anders. nor of Kurz*; leaves oblong acuminate at both ends glabrous lineolate on both surfaces, heads ovoid 1–3 together subsessile, bracts obovate-oblong acuminate inciso-serrate rufous hairy. Ruellia fimbriata, *Wall. Cat.* 2363.

KHASIA MTS.; *Wallich.*

Shrubby; branches glabrous. *Leaves* 4 by 1 in., denticulate; nerves 8 pair; petiole $\frac{3}{4}$ in. *Heads* $\frac{1}{2}$–1 in., closely capitate, mostly on very short axillary spurs; bracts $\frac{3}{4}$ in., shortly acuminate, the innermost lanceolate, the outermost often subtruncate; bracteoles $\frac{1}{3}$ in., linear. *Corolla* $1\frac{1}{4}$–$1\frac{1}{2}$ in., glabrous without. *Capsule* $\frac{3}{4}$–1 in., oblong, 4-seeded. *Seeds* $\frac{1}{3}$ in., ovate, shaggy; areoles small.—Nees' account of the bracteoles is erroneous; and T. Anderson has taken for *fimbriatus* the remote *S. macrostegius.*

52. **S. pectinatus,** *T. Anders. in Journ. Linn. Soc.* ix. 474; leaves elliptic acuminate at both ends hairy, heads short-peduncled subsolitary ellipsoid, bracts large ovate truncate or pectinate, corolla $1\frac{1}{2}$–$2\frac{1}{4}$ in. pale purple. S. echinatus, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 181. Ruellia pectinata, *Wall. Cat.* 2356.

SIKKIM and BHOTAN, alt. 6000–7500 ft., frequent; *Griffith*, &c. KHASIA and JAINTEA MTS., alt. 4000 ft., frequent; *Wallich*, &c.

A spreading shrub, often 10 ft. *Leaves* 5 by $2\frac{1}{4}$ in., serrate, usually thinly hairy, villous or subtomentose beneath; nerves 9 pair; petiole $\frac{1}{2}$–1 in. *Heads* 1 in., hairy or hirsute; bracts $\frac{3}{4}$–1 in., concave, green; bracteoles $\frac{3}{4}$ in., linear, widened upwards. *Calyx* $\frac{2}{3}$–$\frac{3}{4}$ in., deeply divided; segments linear, glabrous, scarious. *Corolla* wide-funnel-shaped, nearly glabrous. *Filaments* and *pistil* sparsely puberulous. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. *Seeds* $\frac{1}{6}$ in., thin, ovate, mature shaggy with brown, somewhat deciduous, scarcely elastic hairs; areoles small.—From Nees' quotation (in *Wall. Pl. As. Rar.*) it is clear that he adopted the name *echinatus* from misreading Wallich's ticket.

VAR. *Daltoni*; brown-villous, leaves tubercular subrugose above, bracts serrulate. —Darjeeling; *J. D. H.*—Possibly a distinct species, but the examples are in early bud, and very near *S. pectinatus.*

53. **S. Simonsii,** *T. Anders. in Journ. Linn. Soc.* ix. 474; leaves broadly lanceolate acuminate softly shortly hairy, heads ellipsoid elongate hairy, bracts elliptic apex produced crenate, bracteoles linear acuminate at both ends softly hairy. *Kurz For. Fl.* ii. 244.

ASSAM; Dewangiri Hills, *Simons*; Namroop in the Patkoye Mts., *Griffith* (Herb. Propr. n. 249). MARTABAN and TENASSERIM, in the tropical forests, *Kurz.*

A shrub; branches pubescent or viscous-hairy. *Leaves* $5\frac{1}{2}$ by 2 in., base cuneate, crenate, minutely lineolate above, more hairy (especially on the 7–8 pair of nerves); petiole $\frac{1}{4}$ in. *Heads* $1\frac{1}{4}$ by $\frac{1}{3}$ in., on very short quasi-peduncles, often 2–3 together; outer pair of bracts (of T. Anderson) leaf-like, sometimes like the true bracts; bract $1\frac{1}{4}$ in., softly shortly hairy; bracteoles 2, $\frac{2}{3}$ in., more acuminate than in the allied species. *Sepals* nearly as the bracteoles. *Corolla* 2 in. (Anderson), glabrous. *Capsule* glabrous, 4-seeded (Anderson).—Anderson apparently had better material than exist now at Kew; he says "buds yellow fide Griffith;" but it is more probable that the flowers are purplish: he certainly erred in reading "Kamroop" in Lower Assam (for Namroop).—It is not probable that a Patkoye Mt. plant should be common in the tropical Tenasserim forests: no example has been seen thence, but Kurz's description coincides with the Patkoye plant. He describes the flowers as blue.

54. **S. glabratus,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC.*

Prodr. xi. 183; leaves elliptic acuminate at both ends mature glabrate, heads ovoid peduncled pubescent or glabrate, bracts ovate or elliptic narrowed upwards concave entire. *T. Anders. in Journ. Linn. Soc.* ix. 474. Ruellia? glabrata, *Wall. Cat.* 2390.—Acanthacea, *Griff. Ic. Pl. As.* t. 425.

KHASIA and JAINTEA MTS., alt. 3–4000 ft.; *Wallich*, *Griffith*, &c.

A shrub, 3–4 ft., erect; branches pubescent, glabrate or with spreading fulvous hairs. *Leaves* 5 by 1¾ in., undulate, crenulate or nearly entire, raphides very obscure on either surface; nerves 7–9 pair; petiole scarcely ⅓ in. *Peduncles* 1–3 in., often subcymose, quadrangular, slightly thickened upwards, fulvous pubescent or glabrate; heads 1¼ in., dense; bracts 1¼ in., coriaceous in fruit; bracteoles ¾ in., sublinear, scarious. *Sepals* resembling the bracteoles. *Corolla* 1 in., subsymmetric, glabrous (blue, *Nees*). *Capsule* ¾ in., broadly oblong, glabrous, 4-seeded. *Seeds* ⅕ in., ovate, shaggy with silky, dusky, subinelastic hair, except on the small areoles.—Wallich's examples are subglabrous, but others are very pubescent.—In *Griff. Notul.* iv. 145, the plate cited t. 425 is named *Phlogacanthus curviflorus*: there is some great blunder here, and the description is puzzling.

55. **S. Maingayi,** *Clarke*; leaves lanceolate acuminate at both ends somewhat pubescent, heads subsessile ovoid nearly glabrous, bracts ovate or elliptic large concave often crenate upwards glabrous.

MALAYA, probably Malacca or Penang; *Maingay* (Kew Distrib. n. 1182).

A shrub, apparently allied to *S. pectinatus* & *glabratus*; branches pubescent. *Leaves* 4 by 1 in., serrulate, puberous and inspersed with most minute raphides; nerves 8 pair, brown-pubescent beneath at least when young; petiole scarcely ¼ in. *Peduncles* 0–⅙ in., rusty-pubescent; heads 1 in.; bracts ¾–1 in., outermost barren ovate, inner elliptic, usually with a few coarse crenations near the apex; bracteoles ¼–⅓ in., linear, glabrous. *Sepals* rather larger than, similar to, the bracts. *Corolla* 1¼ in. at least, glabrous.—No capsule nor expanded flowers seen. There are specimens (unnamed) from Sumatra which may be conspecific with this, but they have hairy heads.

56. **S. glomeratus,** *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves ovate acute serrate hairy, heads ovoid subsessile hairy, bracts elliptic elongate or oblong entire or toothed, corolla 1¼–2¼ in. purplish glabrous. Ruellia glomerata, *Wall. Cat.* 2361. Goldfussia glomerata, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 173; *Bot. Mag.* t. 3881; *Maund Botanist*, t. 155.

KHASIA MTS., alt. 1000–3500 ft., frequent; *Wallich*, &c. BRITISH BURMA, in the hills, *Brandis*, *Parish*.

A shrub, 2–6 ft.; branches hairy upwards, often horizontal with complanate foliage. *Leaves* 4½ by 2½ in., base narrowed or rounded (often unequal), villous above, less so beneath; nerves 6 pair; petiole ¼–1 in. *Heads* 1–1½ in., often pseudo-axillary; bracts 1 by ½ in., herbaceous, softly hairy, outermost pair usually serrate subfoliaceous, inner entire; bracteoles ½–⅔ in., linear-lanceolate. *Calyx* ½–⅔ in., divided nearly to the base; segments linear-oblong, in fruit nervose, membranous, subobtuse. *Corolla* subsymmetric; cylindric nearly as long as the ventricose part. *Filaments* and *pistil* sparsely hairy. *Capsule* ¾ in., broadly oblong, 4-seeded. *Seeds* ⅙ in., densely silkily subinelastically hairy; areoles very small.—T. Anderson has placed this in his *Goldfussia* section, which has "the spikes naked in flower-time and bracts early deciduous;" but the outermost bracts, including the empty pair (floral leaves), are persistent when the capsule is dehiscent.

57. **S. Brandisii,** *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves elliptic acuminate each end thinly hairy, heads obovoid softly densely white-hairy, bracts linear-spathulate, corolla 1¼ in. nearly glabrous.

PEGU; Karen Hills, *Kurz*; Tongoo, alt. 4000 ft., *Brandis* (fide T. Anderson).

Stems slender, shrubby, pubescent or softly shaggy. *Leaves* 4 by 2 in., crenate, lineolate and sparsely slenderly bristly above, paler more glabrate beneath; nerves 6 pair; petiole ⅝ in. *Heads* ¾ in., numerous, on axillary and terminal peduncles; bracts ⅝ in., very narrow, outermost pair often more or less leaf-like, persistent; bracteoles ¼ in., linear. *Sepals* ¼ in. and upwards, linear, densely softly white-hairy. *Corolla* nearly straight and symmetric; cylindric part shorter than the ventricose, lobes ovate. *Stamens* glabrous (T. Anders.). *Capsule* ⅓ in., oblong, glabrous, with a tuft of hairs at the apex, 4-seeded. *Seeds* $\frac{1}{12}$ in., ovate, densely subinelastically silky; areoles very small.

58. **S. Falconeri,** *T. Anders. in Journ. Linn. Soc.* ix. 484; leaves ovate or elliptic acuminate hairy, heads small subsessile dense with long soft silvery bristles, bracts ovate hirsute herbaceous, corolla ¾ in. straight slightly hairy without. S. Karensium, *Kurz in Journ. As. Soc.* 1873, pt. ii. 94, *ex descr.*

MOULMEIN; *Falconer*. TENASSERIM; *Beddome*.

Stem tetragonous, ciliate with long, patent, weak, white hairs. *Leaves* 4 by 1¼ in., narrowed at both ends (upper ovate base obtuse), sparsely white-hairy on both surfaces, not lineolate; nerves 6 pair; petiole ⅜ in. *Heads* 2½ in., surrounded by leaves; bracteoles ½ in., linear. *Calyx* deeply 5-partite; segments shorter than the bracteoles, linear, hirsute. *Corolla* 1¼ in., curved near the mouth, a little hairy without, deep blue; stamens included. *Capsule* tomentose at the apex. *Seeds* large, ovate, hirsute.—The species seems allied to *S. Brandisii*, but is remarkable by the copious long soft white bristles upon the flower-heads, which extend in less numbers to the leaves and stem.

** *Flowers strobilate.*

† *Seeds glabrous.* (Species of Ceylon and S. Deccan Peninsula.)

59. **S. vestitus,** *Nees in DC. Prodr.* xi. 180; hirsute, leaves rhomboid-elliptic acuminate, bracts ovate acuminate hirsute. *T. Anders. in Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 260.

CEYLON, alt. 5–7000 ft.; *Walker, Thwaites.*

Herbaceous (fide *Beddome*); branches stout. *Leaves* 5½ by 2⅔ in., narrowed downwards, cuneate or shortly rounded on the petiole, serrulate, hirsute on both surfaces; nerves 7 pair; petiole 1½ in. *Spikes* 1–3½ in.; bracts ⅔ in., somewhat squarrose; bracteoles ⅓ in., oblong. *Calyx* ⅓ in. (in fruit ⅔ in.), divided nearly to the base; segments lanceolate, shaggy with white or tawny hairs. *Corolla* 1¼ in., subsymmetric, glabrous; cylindric base short, broad. *Filaments* and *pistil* glabrous. *Capsule* ½–⅔ in., 4-seeded. *Seeds* ¼ in., thin, ovate, apiculate, glabrous; areoles very small, oblong.

60. **S. Hookeri,** *Nees in DC. Prodr.* xi. 185, *excl. Var. β*; leaves broadly lanceolate, base cuneate sparsely hairy or glabrate, bracts orbicular or ovate glabrous or slightly ciliate. *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 469; *Bedd. Ic. Pl. Ind.* t. 262.

CEYLON, alt. 7000 ft.; *Gardner, Thwaites,* &c.

A shrub, 5–6 ft., branches nearly glabrous. *Leaves* 5½ by 2 in., acuminate, serrulate, upper surface with scattered weak hairs above or mature glabrous; nerves 8 pair; petiole 1 in. *Spikes* 1–3 in.; bracts 1 in., entire or minutely toothed, obtuse or subacute, white; bracteoles ½ in., spathulate-oblong. *Calyx* ⅔ in., divided nearly to the base; segments lanceolate, often setulose, white. *Corolla* 1¼ in., campanulate, subsymmetric, glabrous, white with purple streaks; cylindric base broad, very short. *Stamens* and *pistil* glabrous. *Capsule* ½ in., frequently 2-seeded. *Seeds* ¼ in., very thin, ovate, apiculate, glabrous; areoles very small, oblong.—The colours are from a field-note of Col. Walker. This is placed by T. Anderson in a section

far removed from *S. vestitus*; but it is so nearly allied that the specimens have been sometimes confounded by the best botanists.

61. **S. calycinus,** *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 469; leaves elliptic acuminate at both ends hairy on both surfaces, bracts spathulate ovate obtuse glabrous or hairy. *Bedd. Ic. Pl. Ind. Or.* t. 209. S. coloratus, *Nees in DC. Prodr.* ix. 186, *not of T. Anders.*

CEYLON, alt. 5–7000 ft.; *Gardner*, &c.

A shrub, 4–6 ft., stem glabrous below, more or less hairy upwards. *Bracts* spathulate, often subpetioled, lower passing sometimes into leaves as shown in Beddome's figure. *Corolla* varying from green to a lurid reddish yellow. *Seeds* 4 to the capsule, scarcely $\frac{1}{8}$ in., obovate.—Otherwise as *S. Hookeri*, from which this species (which is Nees' *S. coloratus*) differs at sight by being a little more hairy. The *S. calycinus* var. *β* of Nees is founded on a sheet of 3 fragments, whereof 2 are *S. calycinus* T. Anders., 1 is *S. Hookeri.*

VAR. ? *parvifolia*; leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long, heads small 2–5-fld., corolla scarcely $\frac{3}{4}$ in., anthers subexserted. S. calycinus, *Nees in DC. Prodr.* ix. 469.—Ceylon; *Walker.*

62. **S. laxus,** *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 469; leaves cordate ovate acuminate minutely scabrous-hairy or glabrate, bracts ovate or orbicular subentire glabrous or ciliate. *Bedd. Ic. Pl. Ind. Or.* t. 223.

CEYLON; Hantani, alt. 4000 ft., *Thwaites.*

A shrub, 4–6 ft.; branches glabrate. *Leaves* 6 by $3\frac{1}{2}$ in., crenate or toothed; nerves 6 pair; petiole 2 in. *Spikes* 2–5 in., often in dense subsessile clusters on the old wood; bracts $\frac{1}{2}$–1 in.; bracteoles $\frac{1}{3}$ in., linear-oblong. *Sepals* $\frac{1}{2}$ in. (or more in fruit), lanceolate or broadly lanceolate, ciliate. *Corolla* $\frac{3}{4}$–1 in., glabrous except hairy lines within, orange-red; ventricose portion short, about as long as the contracted portion; lobes ovate, elongate, subacute, as described by T. Anderson, not well shown in Beddome's figure. *Stamens* and *pistil* glabrous. *Capsule* $\frac{1}{2}$ in., narrowly ellipsoid, 4-seeded. *Seeds* $\frac{1}{6}$–$\frac{1}{5}$ in., thin, obovate or subquadrate, glabrous; areoles obsolete.—Easily distinguished from the allied Ceylon species by the broad decisively-cordate base of the leaves.

63. **S. Andersonii,** *Bedd. in Trans. Linn. Soc.* xxv. 222, and *Ic. Pl. Ind. Or.* t. 208; leaves rhomboid-elliptic or ovate acuminate loosely villous on both surfaces, bracts elliptic obtuse glabrous ciliate. *T. Anders. in Journ. Linn. Soc.* ix. 469.

S. DECCAN; Anamallay Mts., alt. 6000 ft., *Beddome.*

A very large shrub up to 20 ft. (Beddome); branches hairy upwards. *Leaves* 7 by 4 in., rhomboid, base rounded or subcordate, crenulate; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Spikes* 1–$2\frac{1}{2}$ in., axillary, nodding; bracts $\frac{3}{4}$ in.; bracteoles $\frac{2}{3}$ in., linear-oblong. *Sepals* $\frac{2}{3}$–$\frac{3}{4}$ in., linear-oblong, ciliate. *Corolla* $1\frac{1}{4}$ in., subcampanulate, contracted base very short, subsymmetric, glabrous except hairy lines within, pale-blueish. *Stamens* and *pistil* glabrous. *Capsule* not seen; but the species is doubtless closely allied to *S. calycinus*, as Beddome says, and the leaves still more resemble *S. vestitus.*

64. **S. luridus,** *Wight Ic.* t. 1515–6; leaves ovate acuminate closely softly hairy on both surfaces, bracts large orbicular entire glabrous. *T. Anders. in Journ. Linn. Soc.* ix. 469.

NILGHERRY MTS., alt. 3–5000 ft.; *Gardner, Wight*, &c. ANAMALLAY MTS. (fide Beddome's list).

Gregarious shrubs, 10–18 ft. high, often forming entire coppices, flowering every

spring from the old wood, often from near the ground. *Leaves* 6 by 3 in., tapering at the base, crenulate; nerves 9 pair; petiole 1¼ in. *Spikes* 3–11 in., often clustered, pendulous; bracts ¾ in., blackish-purple; bracteoles ¾ in., ligulate, minutely scabrous. *Calyx* ¾ in., divided nearly to the base; segments lanceolate, minutely scabrous. *Corolla* 1–1¼ in., glabrous except lines within, lurid purple, somewhat 2-lipped; ventricose portion short, longer than the contracted portion; lobes ovate. *Stamens* and *pistil* glabrous. *Capsule* ¾ in., usually 4-seeded. *Seeds* ⅓ in., thin, obovate, obtuse, glabrous; areoles obsolete.

65. **S. bolamputtensis,** *Bedd. Ic. Pl. Ind. Or.* t. 200; leaves ovate acuminate glabrous except few scattered minute bristles, bracts large orbicular serrate softly hairy afterwards glabrate.

S. DECCAN; Bolamputty Hills near Coimbatore, alt. 6000 ft., *Beddome.*

A shrub, 15 ft., flowering every year from the old wood; habit of *S. luridus. Leaves* 6 by 3 in., base attenuate, crenulate or toothed, lineolate, white-bristly sparsely on the surface above and on the 6–7 pair of nerves beneath; petiole 1½ in. *Spikes* 2–4 in., very broad, from the old wood and also terminal; bracts ¾–1¼ in. wide, obtuse; bracteoles ½ in., narrowly oblong. *Sepals* ¾ in. (at least in fruit), broadly lanceolate, ciliate, somewhat white-bristly. *Corolla* 1 in., subcampanulate, glabrous, brown (Beddome); lobes short in Beddome's picture, appear longer more as of *S. luridus* in his example. *Stamens* and *pistil* glabrous. *Capsule* ¾ in., broadly oblong, 4-seeded. *Seeds* ¼ in., thin, subquadrate, glabrous; areoles obsolete.

†† *Seeds hairy* (where known).

66. **S. callosus,** *Nees in Wall. Pl. As. Rar.* iii. 85 *chiefly,* and in *DC. Prodr.* xi. 185 *chiefly*; leaves elliptic acuminate at both ends sparsely hairy above glabrate beneath, bracts ovate or elliptic concave obtuse glabrous, bracteoles 0, capsule 2-seeded. *Dalz. & Gibs. Bomb. Fl.* 188; *T. Anders. in Journ. Linn. Soc.* ix. 469. S. Grahamianus, *Wight Ic.* t. 1520; *Dalz. & Gibs. Bomb. Fl.* 187; *T. Anders. in Journ. Linn. Soc.* ix. 469. Ruellia callosa, *Wall. Cat.* 2359.—Strobilanthes sp. n. 69, *Herb. Ind. Or. H.f. & T.*

BOMBAY GHAUTS and CENTRAL INDIA; *Graham, Dalzell,* &c.

A shrub, 6 ft.; branches glabrate, often warted or scabrous-tubercled. *Leaves* 7 by 3 in., sometimes much larger, crenate, conspicuously lineolate above; nerves 8–16 pair; petiole 2 in. *Spikes* 1–4 in., often densely or laxly cymose; bracts ½–1 in., orbicular or elliptic. *Calyx* ½ in., in fruit often exceeding ¾ in., lobed nearly to the base, segments oblong, obtuse, softly hairy. *Corolla* 1½ in., subsymmetric, glabrous without, very hairy within, deep-blue (Dalzell); cylindric base as long as the ventricose portion. *Filaments* hairy downwards. *Pistil* glabrous. *Capsule* ¾ by ⅓ in. *Seeds* more than ⅓ in. long, thin, obovate acute, densely shaggy with white adpressed inelastic hairs, except on the large oblong areoles.—As Dalzell says his *S. callosus* had the seeds "quite smooth," it might be supposed that he considered the present plant *S. Grahamianus,* and called *S. Dalzellii,* T. Anders. his *S. callosus*; but a reference to his Herbarium and notes shows this was not so. He distinguished *S. Dalzellii* as a species, but proposes no name for it; while he (most erroneously) notes on his own excellent fruiting specimen of *S. callosus* that it differs from *S. Grahamianus* in having the seeds glabrous.

VAR. *hispida*; bracts copiously white-hispid.—Dasgowa, in the Mahratta country, *Hove.*

67. **S. zeylanicus,** *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; glabrescent, leaves ovate shortly acuminate at both ends, bracts ovate often with a ligulate apex, bracteoles about as long as the calyx. *Bedd. Ic. Pl. Ind. Or.* t. 224. S. callosus, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 185, *the Ceylon material.*

CEYLON; *Walker*; alt. 2000 ft., *Thwaites*.

A shrub, 3–5 ft. *Leaves* 7 by 3¼ in., crenate, lineolate on both surfaces; nerves 7 pair; petiole 1½ in. *Spikes* quasi-peduncled, mostly solitary, sometimes 1 in. ovoid capitate, sometimes 2½ in., distinctly densely strobiliform; bracts 1 in., entire or denticulate, the ligulate tip often squarrose sometimes closely reflexed in fruit, sometimes obsolete. *Calyx* ½ in., divided more than half-way down; segments lanceolate, slightly hairy. *Corolla* 1¼ in., narrow, hairy, white (T. Anderson); linear-cylindric base shorter than the long urn-shaped upper part; lobes short. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* not seen.—Evidently different from the Bombay *S. callosus*, but may not belong to this part of the series.

68. **S. asper,** *Wight Ic.* t. 1518, *not of Dcne.*; thinly softly hairy, leaves ovate shortly acuminate at both ends, spikes in close panicles or subfasciculate, bracts oblong or ovate, base narrowed. *T. Anders. in Journ. Linn. Soc.* ix. 466.

MTS. of S. INDIA, alt. 5–8000 ft.; Nilgherries, Anamallays, Bababooduns, *Gardner*, *Wight*, &c. MALABAR GHATS; Concan, *Stocks*.

A shrub, 2–4 ft. *Leaves* 4½ by 2¼ in., crenate; nerves 7 pair; petiole 1½ in. *Spikes* in flower 1–1½ in., oblong; in fruit 2–3 in., with bracts and calyces enlarged; thinly softly hairy, somewhat viscous; bracts ¼–½ in., often reddish; bracteoles ¼ in., linear. *Sepals* ⅓ in., linear-lanceolate. *Corolla* ¾ in. (or in Wight's figure much larger), glabrous without, hairy within; linear-cylindric base about as long as the ventricose portion; limb somewhat oblique, segments short rounded. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* ⅓ in., oblong, 4-seeded. *Seeds* $\frac{1}{12}$ in., orbicular, elastically hairy; areoles prominent, round, glabrous.—The form of the bracts seems very variable; the typical Nilgherry plant has them broadly ovate; a Bababoodun example (reckoned by Wight distinct) has them linear-oblong; and there are a great number of intermediate forms.

69. **S. sessilis,** *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 177; leaves sessile ovate acute hairy, spikes cylindric exactly strobiliform, bracts large ovate acute hairy, bracteoles 0, corolla 1¼ in. pale purple. *Bot. Mag.* t. 3902; *Wight Ill.* t. 164 b, fig. 4 (right-hand), and *Ic.* t. 1511; *T. Anders. in Journ. Linn. Soc.* ix. 467.

NILGHERRY MTS., alt. 6–8000 ft.; *Wight*, &c., frequent. WYNAAD and TRAVANCORE; *Beddome*.

Stems 12–18 in., numerous, erect, little divided, from a woody perennial root, patently villous. *Leaves* ¾–1½ in., base rounded or subcordate, crenate, softly villous on both surfaces. *Spikes* 1–2 in., short-peduncled, quasi-axillary and terminal; bracts ¾ in., softly hairy. *Sepals* ½ in., lanceolate. *Corolla* nearly straight, subsymmetric, slightly hairy within and without; cylindric base nearly as long as the ventricose part; segments rounded. *Filaments* included; longer shaggy, shorter glabrous with much smaller anthers. *Ovary* glabrous, gland-bearing near the tip; style thinly hairy; ovules 4. *Capsule* not seen.

VAR. *sessiloides* (*Wight Ic.* t. 1512); leaves larger bristle-hirsute rugose, spikes larger, bracts (especially the upper) corolloid glabrate upwards, corolla rather larger more hairy both within and without. S. sessiloides, *Wight Ic.* t. 1512, *not of T. Anders.*—Nilgherries; *Wight*.—A very trifling variety (or mere form, *Beddome*) of *S. sessilis*.

VAR. *Ritchiei*; bristly without any soft hairs, leaves nearly glabrous beneath except the bristly nerves, bracts acuminate long-bristly. S. sessiloides, *Dalz & Gibs. Bomb. Fl.* 187; *T. Anders. in Journ. Linn. Soc.* ix. 467, *not of Wight*.—Malabar Ghats; near Bombay, *Dalzell*; Purwhar Ghat, *Ritchie*; Tulkut (perhaps i.e. Talikote), *Stocks*.—Noted by Ritchie as flowering only once in 7 years, but the woody root with annual undivided stems seems the same as in *S. sessilis*. *Stems* densely hispid with very long stout white bristles or glabrate. *Leaves* scabrous-hispid lineolate above, much more glabrous than in *S. sessilis*. *Bracts* and *spikes* with white or tawny bristles nearly ¼ in. long, sometimes dense sometimes few scattered.

70. **S. Dupeni,** *Beddome ms.*; leaves subcordate ovate acuminate bristly pubescent on both surfaces, spikes large oblong dense viscous slightly hairy, bracts 4-ranked large ovate obtuse adnate at base closely imbricate, capsule 4-seeded, seeds hairy.

ANAMALLAY MTS.; top of Neliamputty Ghat, *Beddome.*

A shrub. *Leaves* 4½ by 2¼ in., crenate, bristly above, chiefly on the 9 pair of nerves beneath; raphides small, obscure; petiole 1–2 in. *Spikes* 2½ by ¾ in., appearing terminal on short axillary peduncles; bracts ¾ by ½ in., coloured, nervose, very sticky; bracteoles small, lanceolate. *Calyx* ½ in., deeply 5-lobed; linear green acumination of the segments longer than the short elliptic scarious base. *Corolla* large, blue. *Capsule* ⅓ in., ellipsoid, sessile, glabrous. *Seeds* ⅛ in. diam.; areolæ nearly half the diam. of the seed.

71. **S. auriculatus,** *Nees in Wall. Pl. As. Rar.* iii. 69, 86, t. 295, and in *DC. Prodr.* xi. 191; leaves sessile auriculate oblong or ovate acuminate hairy, spikes linear oblong closely velvety, bracts obovate obtuse, bracteoles 0. *T. Anders. in Journ. Linn. Soc.* ix. 472; *Bedd. Ic. Pl. Ind. Or.* t. 210. S. amplectens, *Nees in Wall. Cat.* 7158, and in *DC. Prodr.* xi. 191. Ruellia auriculata, *Wall Cat.* 2341.

CENTRAL INDIA, alt. 1–4000 ft., common; Behar; Jubbulpore to Chota Nagpore, *J. D. H., Beddome,* &c.—DISTRIB. Ava.

A shrub, 2–6 ft.; branches many divaricate often zigzag, quadrangular, glabrous, tips more or less hairy. *Leaves* often very unequal, sometimes one 10 by 2¼ in. oblong, the other 3 by 1½ ovate, sometimes subequal, serrulate, sparsely hairy above; nerves (in the longer leaves) 10–13 pair, minutely hairy beneath. *Spikes* 3½ by ½ in., mostly terminal, solitary, quasi-peduncled; bracts ¼–⅓ in., broader than long, very obtuse, apex often recurved in fruit. *Calyx* divided nearly to the base; segments ¼–⅓ in., unequal, linear, obtuse, closely velvety. *Corolla* 1 in., curved, very slightly hairy, pale purple; cylindric base much shorter than the ventricose part; limb somewhat 2-lipped. *Stamens* and *pistil* nearly glabrous. *Capsule* ⅓ in., glabrous, 4-seeded. *Seeds* scarcely 1/12 in., thin, orbicular, elastically white-hairy; areoles very small.

VAR. *Edgeworthiana*; bracts with spreading white cilia ¼ in. long, sepals long white-ciliate at the tips. *S. Edgeworthiana,* Nees in DC. Prodr. xi. 190.—Subtropical Himalaya, alt. 500-2000 ft., from the Siwaliks (*Stewart*) to Sikkim (*Gamble*), frequent in the dry Terai. Parasnath, *Edgeworth.* Tenasserim; alt. 2000 ft., *Beddome.*—Distrib. Upper Burma.

VAR. *plumulosa*; leaves broadly elliptic, spikes short axillary subsessile densely white-ciliate. *S. plumulosus,* Nees in Wall. Cat. 7157, and in Wall. Pl. As. Rar. iii. 86, and in DC. Prodr. xi. 191.—Mts. of Prome; *Wallich.*—*Leaves* 8 by 3½ in., subequal, spathulate to the widened auriculate base. *Spikes* 1–1½ in.

VAR. *bracteolata*; leaves sessile auriculate oblong acuminate hairy, spikes linear-oblong ciliate, bracts obovate, bracteoles ¼ in. linear-spathulate.—Khasia Mts., alt. 5000 ft.; Nunklow and Myrung, *H. f. & T.*—*Branches* divaricate, hairy. *Leaves* unequal, the larger 4½ by ¾–1 in., serrate. *Spikes* 1–2½ in., quasi-peduncled, mostly solitary; bracts ⅓ in., less obtuse than those of *S. auriculatus.*

72. **S. Maclellandi,** *Clarke*; leaves large elliptic acuminate at both ends sparsely hairy, spikes linear, bracts obovate obtuse white hairy, bracteoles 0.

RANGOON; *M'Lelland.*

Branches stout, quadrangular, zigzag, hairy. *Leaves* 12 by 4½ in., lower petioled, uppermost subsessile, none auricled; nerves 20 pair. *Spikes* 3 by ¼ in., slender, white, hairy, pendent mostly 3 together from short axillary peduncles.—This has been supposed a form of *S. auriculatus,* but the large many-nerved leaves and slender pendent spikes give it a different aspect: the capsule is rather larger, the seeds nearly the same as in *S. auriculatus.* It would appear distinct enough but for the subjoined variety.

VAR. ? *latipes*; leaves sessile suddenly narrowed subauriculate, bracts narrowly obovate.—Tenasserim; *Beddome.*—*Leaves* 13 by 4½ in., primary nerves 20 on each side the midrib.

73. **S. Sabinianus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 190; leaves petioled broadly elliptic shortly acuminate at both ends nearly entire uppermost often sessile cordate, spikes linear pubescent often interrupted towards the base, bracts obovate obtuse, sepals oblong minutely pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 472. Ruellia Sabiniana, *Wall. Cat.* 2338; *Bot. Reg.* t. 1238; *Reichb. Exot.* t. 210. R. argentea, *Wall. Cat.* 2339.

NEPAL; *Wallich.* KHASIA MTS., alt. 1–4000 ft., frequent; *Wallich,* &c.

A shrub, 2–5 ft.; branches glabrous. *Leaves* 6½ by 3 in., undulate, subcrenate, lineolate, minutely setulose above, glabrate or obscurely pubescent beneath; upper leaves often unequal dissimilar, one of each pair smaller sessile cordate. *Spikes* 2–4 in., quasi-peduncled, mostly solitary; bracts ¼ by ⅓ in.; bracteoles ¼ in., oblong. *Sepals* scarious, minutely glandular-pilose, obscurely oblanceolate not spathulate. *Corolla* 1¼ in., curved, much ventricose nearly glabrous, lavender-coloured, contracted base short. *Filaments* glabrous. *Capsule* scarcely ⅓ in., pubescent, 4-seeded. *Seeds* $\frac{1}{12}$ in., much compressed, orbicular; when wet the fine white hairs spring out abundantly; areoles nearly half the diam. of the seed, glabrous.—The figures *Bot. Mag.* t. 3517 and *Lodd. Bot. Mag.* t. 1712, adduced for this species by Nees and T. Anderson, show the uppermost leaves petioled much acuminate at the base. Some examples of *S. Sabinianus* have the spike much interrupted, and the species might be placed in the next section. Wallich notes, in the Nepal example named *R. argentea,* that the flowers were white.

74. **S. tamburensis,** *Clarke*; leaves ovate shortly acuminate serrate, spikes linear interrupted towards the base ciliate subhirsute, bracts ovate, sepals spathulate ciliate.

E. NEPAL; at the Tambur River, alt. 4–5000 ft., *J. D. H.*

Capsule upwards of ⅓ in., 4-seeded. *Seeds* $\frac{1}{12}$ in., much compressed, orbicular in outline, covered all over with short inelastic hairs; areoles 0. The general habit and corolla as of *S. Sabinianus,* but the serrate leaves, subhirsute spike, and seeds will not match.

75. **S. nutans,** *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves ovate or broadly elliptic acuminate serrate hairy, spikes ellipsoid or oblong very dense glabrous, bracts large elliptic concave. Ruellia strobilina, *Wall. Cat.* 2362. R. hirta, *Don Prodr.* 119. Goldfussia nutans, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 174.

NEPAL; *Wallich.*

A shrub, 1–2 ft.; branches hairy. *Leaves* 3 by 1½ in., base attenuate or rounded, with scattered hairs on both surfaces, not lineolate; nerves 7 pair; petiole ¼–1 in. *Peduncles* ½–1½ in., divaricate or deflexed, hairy; spikes 1–1½ by ⅔ in.; bracts ½ in., subacute; bracteoles ⅓ in., oblong. *Calyx* ¼–⅓ in., divided nearly to the base, segments linear glabrous. *Corolla* 1–1¼ in., curved; ventricose part longer than the contracted base. *Capsule* not seen; and the place of the species is dubious; the spike resembles that of some of the strictly strobiliform Malabar species; Nees says the bracts are deciduous, but they cannot be so till long after flower.

76. **S. acrocephalus,** *T. Anders. in Journ. Linn. Soc.* ix. 473; leaves ovate acute crenate hirsute, spikes peduncled solitary linear-cylindric dense hairy, bracts ovate, seeds puberulous subglabrate. Adenosma affinis, *Griff. Notul.* iv. 133.

KHASIA MTS., alt. 4–5000 ft., plentiful in the northern half, *Griffith, H. f. & T.,* &c.

Shrubby, 1–2 ft., branching; stems hirsute. *Leaves* 2½ by 1½ in., base obtuse or rounded, densely minutely lineolate above; nerves 7–8 pair; petiole ⅜ in. *Peduncles* 1–4 in., hirsute; bracts ⅓–½ in., obtuse or scarcely acute, closely strobilate; bracteoles ¼ in., spathulate-oblong. *Calyx* ½ in., divided ⅝ the way down; segments narrowly oblong, obtuse, hairy. *Corolla* 1 in., curved, glabrous without, purplish; cylindric base scarcely so long as the ventricose portion; limb somewhat 2-lipped. *Stamens* glabrous. *Ovary* hirsute at the apex, style sparsely hairy. *Capsule* ¼ in., hairy, 4-seeded. *Seeds* $\frac{1}{12}$ in., orbicular, distinctly pubescent when young, mature subglabrous, the base of the short hairs only remaining; areoles 0.—A species not very closely allied to any other in the genus.

77. **S. imbricatus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and *Cat.* 7156, and in *DC. Prodr.* xi. 186; leaves spathulate elliptic acute sparsely hairy on both surfaces, spikes cylindric strobiliform in axillary quasi-panicles, corolla very small, placentæ rising elastically from the bottom of the dehiscing capsule. *T. Anders. in Journ. Linn. Soc.* ix. 473. S. pterocaulis, *Kurz in Journ. As. Soc.* 1873, pt. ii. 93.

PEGU and TENASSERIM; *Helfer, M'Lelland, Kurz.*—DISTRIB. Ava.

An annual herb fide Kurz, but the examples have all the appearance of the other perennial species; stems stout, sharply quadrangular, hirsute or glabrate. *Leaves* attaining 12½ by 5 in. (or the upper much smaller 2 by 1 in.), crenate or toothed, lineolate on the upper surface; nerves (in the larger leaves) 15 or more pair; petiole very short owing to the long-decurrent leaf-base. *Spikes* 1½ in., mostly 5–11 in lax hirsute axillary panicles; leaves at the trichotomous divisions scarcely ⅛ in.; bracts ⅛ in., obovate-oblong, hirsute towards the apex; bracteoles ⅙ in., linear-spathulate. *Sepals* ¼ in., linear, obtuse, hirsute at the tips. *Corolla* ⅓ in., subcampanulate, violet ex Nees, yellow ex Kurz. *Capsule* ¼ in., hairy at the tip, 4-seeded. *Seeds* $\frac{1}{18}$ in., orbicular, hairy; areoles nearly half the diam. of the seed, glabrous.—The spikes in fruit are like those of *Rungia.* Wallich's specimens from Ava have much smaller leaves than the Pegu examples.

78. **S. longipes,** *Clarke*; leaves elliptic acuminate at each end subentire pubescent or glabrate, spikes oblong hairy or glandular-puberulous, bracts narrowly obovate obtuse or emarginate, calyx nearly equally sub-5-partite segments linear-spathulate obtuse, corolla 1¾ in. S. acuminatus, *T. Anders. in Journ. Linn. Soc.* ix. 478, *chiefly* (not Adenacanthus acuminatus, Nees).

TENASSERIM; *Helfer* (Herb. Propr. n. 304, Kew Distrib. n. 6114); Mooleyit, *Beddome.*

Branches slender. *Leaves* 6 by 2½ in., obscurely toothed, raphides conspicuous in the lower paler surfaces, embedded obscure in the upper; nerves 8 pair; petiole ¼ in. *Spikes* 1–2½ in., clavate-oblong, continuous; bracts ¼–⅓ in., lower deciduous in fruit; bracteoles ¼ in., linear-obovate. *Calyx* ½ in. and upwards; segments distinctly wider at the tips. *Corolla* nearly straight, puberulous; ventricose portion nearly 1 in., linear portion ½ in.; lobes rounded, subequal. *Capsule* ⅓ in., pubescent at the tip, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovoid, inelastically shaggy; areoles subobsolete.—Kurz has founded his *S. subflaccidus* on Helfer's plant (Kew, n. 6114), but, as he says the calyx is 2-lipped with the upper lip three-lobed only ⅓ the way down, it is clear that his *S. subflaccidus* cannot be this plant; there may have been some error in distribution, or Kurz may have relied on T. Anderson's reduction of this n. 6114 under *Adenacanthus,* Nees.

79. **S. subcapitatus,** *Clarke*; leaves elliptic acuminate subentire glabrous, spikes ellipsoid or subovoid small laxly peduncled, bracts elliptic concave or obovate minutely ciliate-pubescent.

TENASSERIM; *Helfer* (Kew Distrib. n. 6111).

Shrubby; branches slender, quadrangular, glabrous. *Leaves* 4 by 1¾ in., base

attenuate or obtuse, conspicuously lineolate above, obscurely so beneath; nerves 6 pair; petiole ⅛ in. *Peduncles* 2–4 in., slender, quadrangular, glabrous, numerous, axillary, often divided, sometimes bearing reduced caducous leaves; bracts ⅓ in., rounded at the tip, densely lineolate; bracteoles ⅙ in., linear-obovate, densely lineolate. *Calyx* ¼ in., divided subequally nearly to the base; segments linear-spathulate, minutely ciliate. *Corolla* not seen. *Capsule* ⅓ in., pubescent at the tip, 4-seeded. *Seeds* $\frac{1}{12}$ in., ovate, densely shaggy; areoles small.—Seems very nearly allied to *S. subflaccidus*, Kurz; but the spikes are in general so much shortened that it might be looked for among the capitate series. As in *S. subflaccidus*, the fruiting spikes have the upper bracts, but some of the lower fallen.

*** *Spikes elongate more or less interrupted, or flowers nearly all distant but mostly opposite.*—(Seeds in all hairy.)

80. **S. Helferi**, *T. Anders. in Journ. Linn. Soc.* ix. 472; leaves ovate acuminate rounded or subcordate at the base nearly glabrous, spikes simple elongate lax subtomentose, flowers distant opposite, bracts broadly obovate obtuse, corolla 1¼–1½ in.

TENASSERIM, "Three Pagodas," *Helfer* (Kew Distrib. n. 6117).

Branches divaricate, somewhat zigzag, terete, pubescent upwards. *Leaves* 3½ by 1½ in., crenate, puberulous and lineolate above, subpubescent on the 7 pair of nerves beneath; petiole 1 in. *Spikes* axillary, short-peduncled, solitary, opposite, 2–5 in.; flowers nearly all paired and distant; bract 1 to each flower, ¼ in., densely minutely fuscous-pubescent, ciliate, apex ⅓ in. broad green patent or reflexed; bracteoles 0. *Calyx* ⅕ in., equally sub-5-partite; segments linear-ligulate, pubescent, subobtuse. *Corolla* nearly glabrous, straight; cylindric base twice as long as the calyx. *Capsule* ¼ in. *Seeds* $\frac{1}{12}$ in., orbicular, dusky pubescent; areoles small.—T. Anderson errs in saying "corolla small;" the buds, which appear on the point of expansion, are scarcely ½ in. long; but there is one fully expanded flower overlooked by T. Anderson, which is (dry) nearly 1½ in.

81. **S. macrostegius**, *Clarke*; leaves elliptic acuminate subentire nearly glabrous, spikes axillary sessile lax scarcely interrupted, bracts obovate suddenly linear-acuminate, capsule and seeds large. S. fimbriatus, *T. Anders. in Journ. Linn. Soc.* ix. 470 *partly, not of Nees.* Endopogon macrostegius, *Nees in DC. Prodr.* xi. 470.

ASSAM and KHASIA MTS.; *Griffith.* CHITTAGONG; Kasalong, *Clarke.*

A straggling, inelegant shrub, 2–5 ft.; branches terete, pubescent upwards or nearly glabrous. *Leaves* 6 by 2¼ in., base cuneate, lineolate above, obscurely so beneath, minutely pubescent on the 9 pair of nerves beneath; petiole 1½ in. *Spikes* 2–5 in., with 6–8 flowers in opposite pairs; bracts ¾–1 in., including the linear acumen ½ in. long, pubescent, or in Griffith's examples subglabrous; bracteoles ⅔ in., linear-oblanceolate cuspidate, fulvous-pubescent upwards. *Sepals* in fruit similar to the bracteoles. *Corolla* not seen. *Ovary* glabrous, a dense fulvous tuft of hairs at the apex. *Capsule* 1 in., oblong, 4-seeded. *Seeds* ⅕ in., ovate, shaggy; areoles obsolete.—Probably *S. fimbriatus*, Kurz (*For. Fl.* ii. 244), from the forests of the Pegu Yomah and Tenasserim, the bracts of which Kurz says are entire, so that it could not have been Nees' *S. fimbriatus.*

82. **S. polythrix**, *T. Anders. in Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate rufous-ciliate, spikes axillary subsessile continuous very rufous-ciliate, bracts 1–1½ in. linear-lanceolate.

KHASIA MTS.; *Herb. Kew* and *Herb. Calc.*

A shrub; branches terete, with patent long rufous hairs. *Leaves* 6½ by 2½ in., base attenuate or subobtuse, remotely serrate, mature with few scattered long rufous hairs; nerves 9 pair; petiole 1 in. *Spikes* 2–4 in., rufous hairs ¼ in. long, slender, patent; bracteoles ¾ in., linear, green, rufous-ciliate. *Calyx* in fruit nearly 1 in.,

divided nearly to the base; segments linear-lanceolate, scarious below, rufous-ciliate upwards. *Corolla* not seen. *Capsule* $\frac{3}{4}$ in., linear-oblong, glabrous, tip minutely rufous-hairy, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, silky; areoles hardly any.

83. **S. Brunonianus,** *Nees in Wall. Pl. As. Rar.* iii. 87, and in *DC Prodr.* xi. 188; leaves lanceolate attenuate at both ends nearly glabrous, spikes subpaniculate linear, bracts oblong, sepals linear oblong fulvous hirsute, corolla $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 472. S. petiolaris, *Nees in DC. Prodr.* xi. 189, *partly.* Ruellia Brunoniana, *Wall. Cat.* 2368.

KHASIA MTS., alt. 2–4000 ft., common, *Wallich,* &c.; lower hills of ASSAM, JAINTEA, and NAGAS country.

An erect, dense, annually-flowering shrub, 2–3 ft. *Leaves* 4 by $\frac{1}{2}$ in. subentire in Wallich's, often broader, sometimes 2 by $\frac{3}{4}$ in. crenate nearly to the base, base always gradually attenuated; nerves 8 pair, often obscure; petiole $\frac{1}{2}$ in., often narrowly winged. *Spikes* 1–4 in., usually very numerous, dense but often interrupted towards the base, erect; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., spathulate-oblong, obtuse, apex recurved or the lowest ovate narrowed upwards, subglabrous in Wallich's specimens, often fulvous-hirsute; bracteoles $\frac{1}{3}$ in., oblong, erect. *Sepals* $\frac{1}{4}$ in. *Corolla* curved, pubescent without in the bud, lavender or white, cylindric base shorter than the much-ventricose upper part. *Stamens* glabrous, more monadelphous than usual. *Capsule* $\frac{1}{4}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., orbicular, pubescent; areoles 0.—*S. petiolaris,* Nees, is founded on two plants collected by Griffith, one in Khasia, one in Assam, which are both preserved at Kew, authenticated in Nees' hand; of these the Khasia one is identically *S. Brunonianus,* Nees, the other is taken as *S. petiolaris* below.

84. **S. maculatus,** *Nees in DC. Prodr.* xi. 190; leaves ovate (upper elliptic) acuminate at both ends nearly glabrous, spikes erect linear subinterrupted at the base compound hairy, bracts oblong or cuneate-oblong, corolla scarcely $\frac{3}{4}$ in. ventricose. Ruellia maculata, *Wall. Pl. As. Rar.* iii. 33, t. 250.

KHASIA MTS., alt. 1–3000 ft., frequent, *Clarke.*

Shrub, 2–4 ft., lax. *Leaves* 5 by $2\frac{1}{2}$–$3\frac{1}{2}$ in. (upper 5 by $1\frac{1}{2}$–2 in.), serrate, mature glabrous or obscurely scabrid-puberulous on the nerves beneath, densely lineolate on the upper surface, often beautifully blotched with white when fresh, and as often uniformly green; nerves 10–11 pair; petiole 1–$1\frac{1}{2}$ in. *Spikes* 1–3 in., forming lateral and terminal cymes or panicles, the uppermost leaves being small, caducous; bracts $\frac{1}{3}$ by $\frac{1}{18}$ in., linear-oblong (in the most characteristic form), but vary to cuneate-oblong bracteoles $\frac{1}{3}$ in., linear-oblong. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., sub-5-partite; segments linear-oblong, unequal, subobtuse, hairy. *Corolla* slightly curved, nearly glabrous, pale blue or lavender, cylindric base nearly as long as the greatly ventricose upper portion; limb subequal, segments short round reflexed. *Stamens* glabrous, monadelphous, exactly as in *S. Brunonianus. Capsule* $\frac{1}{2}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{20}$–$\frac{1}{16}$ in. diam., orbicular, shaggy with long hairs; areoles rather small.—This was sent to Wallich from Silhet; it is common along the lower Khasia range 20 miles N. of Silhet. Wallich's picture, from a cultivated plant, shows the flowers larger than in any of the wild specimens seen; his statement that the species differs essentially from *S. monadelphus* by having the "filaments free at base" is altogether misleading; Nees perhaps went entirely on the somewhat coarse picture in *Wall. Pl. As. Rar.*

85. **S. monadelphus,** *Nees in Wall. Cat.* 7159, and in *Wall. Pl. As. Rar.* iii. 87, and in *DC. Prodr.* xi. 188; leaves ovate acuminate at both ends pubescent on the nerves beneath, spikes erect linear panicle very hairy, bracts ovate often squarrose, corolla scarcely $\frac{3}{4}$ in. ventricose.

KHASIA and JAINTEA MTS., alt. 3–5000 ft., frequent; *Wallich,* &c.

A rather rigid shrub, 2–3 ft.; branches often scabrous, hairy, quadrangular. *Leaves* $3\frac{1}{2}$ by 2 in., serrate, mature usually more or less hairy on both surfaces, not known to

occur blotched; nerves 9–11 pair. *Inflorescence* and *flowers* as of *S. maculatus*, but the bracts usually $\frac{1}{8}$–$\frac{1}{4}$ in. wide towards their base. *Seeds* $\frac{1}{10}$ in. diam., pubescent.—Certainly closely allied to *S. maculatus*, and may be a high-level hairy form of it, as T. Anderson supposed; but besides the difference in the bracts fixed on by Nees the seeds are about double the diam., much more shortly dusky hairy.

86. **S. petiolaris,** *Nees in DC. Prodr.* xi. 189, *in part*; leaves ovate acuminate at both ends mature nearly glabrous, spikes linear panicled hairy, bracts obovate-spathulate, corolla $1\frac{1}{4}$ in. ventricose. S. maculatus, *T. Anders. in Journ. Linn. Soc.* ix. 473, *chiefly.*

SIKKIM and BHOTAN, alt. 3–10,000 ft., common; *Griffith, T. Anderson,* &c. ASSAM; *Griffith.*

A lax shrub, perhaps not specifically distinct from *S. maculatus*; the leaves are often spotted as on it, the small seeds are similar; but the bracts are much broader (as Nees states), and the corolla is much larger, usually purplish or even rose instead of lavender blue; nerves 7 pair, i. e. much more distant than in *S. maculatus* & *monadelphus.* The species reaches a very high level, the Alpine specimens being smaller with smaller leaves but equally large flowers.

VAR. *tubiflos*; spikes divaricate densely glandular-hairy, corolla (unexpanded) more than 1 in. the ventricose portion scarcely $\frac{1}{6}$ in. diam.—Mishmee; Dailoo, *Griffith* (Kew Distrib. nn. 6095, 6103).—"Corolla deep blue; bracts lead-coloured" (Griffith's field-note).—This is very possibly a distinct species, though it must be closely allied to *S. petiolaris*; but it is very dangerous to assume the shape of the corolla from buds in this genus.

87. **S. perfoliatus,** *T. Anders. in Journ. Linn. Soc.* ix. 471; leaves sessile lanceolate or elliptic much acuminate at both ends glabrous, spikes axillary cymose lax subcontinuous very viscid ciliate, bracts oblong linear-acuminate, capsule clavate 2-seeded. Endopogon integrifolius, *Dalz. in Hook. Kew Journ.* ii. 342; *Dalz. & Gibs. Bomb. Fl.* 185. Leptacanthus alatus, *Wight Ic.* t. 1527.

W. DECCAN PENINSULA; Concan, Canara, Coorg, *Law, Dalzell,* &c.

Shrubby, nearly glabrous except the spikes. *Leaves* attaining 15 by $4\frac{1}{2}$ in., more often 6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., very variable in size and in width, sparingly toothed, lineolate above; nerves 6–12 pair; petiole winged to the base, there dilated, auriculate, sometimes subdecurrent, never perfoliate. *Spikes* 2–5 in., closely cymed (or solitary) on very short axillary peduncles, very open, hardly interrupted even at the base in fruit; bracts $\frac{3}{4}$ by $\frac{1}{8}$ in.; bracteoles $\frac{1}{3}$ in., linear. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in. (elongate in fruit), divided nearly to the base, segments linear. *Corolla* $1\frac{1}{4}$ in., straight, glabrous without, hairy within; cylindric base of the tube nearly as long as the ventricose part. *Stamens* included; longer filaments glabrous. *Ovary* glabrous, style thinly hairy. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in., compressed. *Seeds* $\frac{1}{6}$ in., ovate, shaggy; areoles hardly any.

88. **S. glutinosus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 194; viscous hairy, leaves ovate acute, spikes short, lowest bracts leaf-like upper obovate or oblong shorter than the calyx, corolla 2 in. *T. Anders. in Journ. Linn. Soc.* ix. 476. Ruellia glutinosa, *Wall. Cat.* 2350. R. Jacquemontiana, *Nees in DC. Prodr.* xi. 145.

KASHMIR, GURWHAL, KUMAON and NEPAL; *Wallich, Jacquemont,* &c.

A shrub, 2–5 ft.; branches villous. *Leaves* 3 by $1\frac{1}{2}$ in., base cuneate or rounded, crenate, villous on both surfaces; nerves 5–6 pair; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Spikes* densely capitate, or more often the lowest flowers are remote, solitary, opposite in the axils of bract-like leaves; bract $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, subfoliaceous, persistent; bracteoles $\frac{1}{3}$ in., oblong. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., divided nearly to the base; segments linear, obtuse, viscous hairy. *Corolla* nearly glabrous; linear-cylindric base nearly as long as the ventricose part. *Stamens* glabrous. *Capsule* $\frac{3}{4}$ in., viscous-pubescent, 4-seeded.

Seeds $\frac{1}{8}$–$\frac{1}{6}$ in., ovate, shaggy; areoles hardly any.—In spite of the enormous differences in the capsule and seeds, this plant has been much mixed with *Æchmanthera tomentosa.*

Series B. *Nudatæ.* *Bracts* caducous, often before the flowers expand. *Flowers* clustered or in distant mostly opposite pairs; not most of them scattered alternate. *Seeds* in all hairy.—(All, except *S. Newii* from N. India or Malay Peninsula.)

* *Heads even in fruit capitate or ovate, not interrupted below.*

89. **S. geniculatus,** *Clarke*; nearly glabrous, leaves elliptic acuminate serrate, heads 2–3-fld., bracts large ovate acuminate caducous, bracteoles 0. S. gracilis, *T. Anders. in Journ. Linn. Soc.* ix. 474, *not of Beddome.*

MISHMEE; *Griffith* (Kew Distrib. n. 6116).

A small shrub; branches slender, somewhat zigzag. *Leaves* 5 by $1\frac{3}{4}$ in., base cuneate or rhomboid, serrulate, upper surface dense with raphides; nerves 6–7 pair; petiole $\frac{1}{8}$ in. *Peduncles* 1–3 in., with a node carrying two reduced caducous leaves at the middle, there geniculate and sometimes divided; heads $\frac{3}{4}$ in., 2–4 outer bract-like leaves barren, early caducous; bract $\frac{3}{4}$ by $\frac{1}{4}$ in., lineolate. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided nearly to the base; segments linear, unequal, obtuse, glandular. *Corolla* $1\frac{1}{4}$ in., glabrous, purple. *Capsule* $\frac{3}{8}$ in., clavate, 4-seeded, glandular-pubescent. *Seeds* $\frac{1}{10}$ in., ovate, shaggy; areoles small.—Each flower is subtended by one bract, and there are 2–4 outer empty similar bracts; before the expansion of the corolla all the bracts but 1 or 2 of the uppermost fall, and these disappear before fruit.

VAR. *integra*; leaves nearly entire, sepals in fruit nearly $\frac{1}{2}$ in. hairy.—Khasia Mts.; *Clarke. Leaves* 5 by $2\frac{1}{4}$ in., subovate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Seeds* $\frac{1}{8}$ in. and upwards.—Probably merely the fully-developed state of *S. geniculatus,* which Griffith collected in a colder country.

90. **S. capitatus,** *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves ovate acuminate at each end nearly glabrous, bracts elliptic-oblong herbaceous pubescent as long as the calyx, bracteoles half as long as the calyx, corolla $1\frac{3}{4}$–2 in. deep blue. Ruellia capitata, *Wall. Cat.* 2351, *partly*; *Don Prodr.* 120. Goldfussia capitata, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 173. G. biceps, *Nees in Wall. Cat.* 7161, and in *Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 172.—Acanthacea sp. *Griff. Itin. Notes,* 116, n. 213.

SUBTROPICAL HIMALAYA, alt. 1–5000 ft., from NEPAL to BHOTAN, common; *Wallich, Griffith, H. f. & T.,* &c. PEGU; Karen Hills (fide T. Anderson).—DISTRIB. Ava.

A shrub, 1–3 ft. *Leaves* 6 by $2\frac{3}{4}$ in., serrate, obscurely lineolate above, minutely hairy on the nerves beneath; nerves 6–7 pair; petiole $1\frac{1}{4}$ in. *Peduncles* usually short, $\frac{1}{2}$–1 in., sometimes 2–4 in., glabrous or pubescent. *Heads* 1 in. diam., closely capitate even in fruit, many-fld., outer empty bracts sometimes long leaf-like, sometimes hardly half so long as the heads, caducous; bracts proper to each flower elongate upwards, closely adpressedly softly white pubescent; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in., ligulate, herbaceous, pubescent, caducous in fruit. *Calyx* $\frac{1}{2}$ in., deeply divided but connate into a hardened short tube at the base; segments narrowly lanceolate, softly hairy even in fruit. *Corolla* curved, tubular-ventricose, nearly glabrous. *Stamens* glabrous. *Ovary* glandular; style thinly patently hairy. *Capsule* $\frac{1}{2}$ in., slightly clavate, pubescent, 4-seeded. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., ovate, shaggy; areoles small.

VAR. *nitida*; heads larger shining glabrate in fruit, bracteoles nearly as long as the calyx obovate-oblong glabrous fimbriate in fruit.—Khasia Mts.; Mousto, alt. 2500 ft., *Clarke.—Bracts* and *bracteoles* shining scarious in fruit from a short green base. *Seeds* $\frac{1}{8}$ in., densely silky.

91. **S. quadrangularis,** *Clarke*; leaves large subsessile broadly elliptic acuminate at both ends serrate minutely hairy, heads ovoid peduncled, bracts large ovate acute grey pubescent caducous, corolla 1½ in. pubescent without. Ruellia quadrangularis, *Wall. Cat.* 2358. R. bracteata, *Wall. Cat.* 2357 b *only*. Goldfussia bracteata, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 173.

NEPAL; *Wallich*. KUMAON; Mohargari, alt. 6500 ft., and Kalamundi, alt. 8500 ft., *Strachey & Winterbottom.*

Stem 2 ft., herbaceous, acutely quadrangular, somewhat pubescent upwards. *Leaves* 8 by 3½ in., shortly scabrous-setulose above, remotely minutely hairy beneath; nerves 13 pair. *Peduncles* 1–4 in., 1–2 in each axil or the uppermost-subumbellate, hairy, clavate, quadrangular upwards, 1-headed; heads in flower 1½ in.; bracts ¾–1 in., deciduous before the flowers expand; bracteoles 0. *Calyx* ⅓ in., distinctly gamosepalous, subequally 5-fid; segments linear-oblong, green, very viscidly golden-pubescent. *Corolla* in shape nearly as of *S. Dalhousianus*. *Capsule* not seen.

92. **S. pentstemonoides,** *T. Anders. in Journ. Linn. Soc.* ix. 477, *in part*; leaves elliptic acuminate at both ends glabrous, bracts orbicular concave whitened glabrous, bracteoles 0, calyx pubescent, corolla 1½ in. nearly glabrous pale purple. Ruellia pentstemonoides, *Wall. Cat.* 2340. R. Cephalotes, *Wall. Cat.* 2352. R. capitata, *Wall. Cat.* 2351, *partly*. Goldfussia pentstemonoides, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175; *Wight Ic.* t. 1510.

SUBTROPICAL HIMALAYA, alt. 1–6000 ft., from NEPAL to BHOTAN, frequent; *Wallich, H. f. & T.*, &c.

A much branched shrub, 3–8 ft. diam.; stems glabrous. *Leaves* 6½ by 2½ in., closely serrate, lineolate on both surfaces; nerves 7 pair; petiole ½ in. *Peduncles* 1–3 in., sometimes glandular-hairy, 1–2 together, mostly 1–3-headed; heads ½–1 in., young exactly globular, outer bracts enclosing the heads; but in some of Wallich's examples the young heads are oblong-cylindric, strobiliform; bracts ¼–½ in., obtuse, early caducous. *Calyx* ¼ in., in fruit often ½ in., divided nearly to the base, segments linear. *Corolla* more or less curved; narrow part of the tube sometimes minutely pubescent. *Stamens* glabrous. *Capsule* ⅝ in., oblong-clavate, glandular-pubescent, 4-seeded. *Seeds* ⅛ in., ovate, silky; areoles very small.

VAR. *flexuosa*; small, branches short flexuose rooting, peduncles long with 1 small head. Ruellia flexuosa, *Wall. Cat.* 2412. Goldfussia flexuosa, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175.—"India," *Herb. Wight*. *Branches* 1–1½ foot, apparently prostrate. *Leaves* 2½ by ¾ in., thinly herbaceous; nerves 5 pair.—The example in Herb. Wight looks very unlike the Himalayan *S. pentstemonoides*; and, though taken up as a species by Nees, T. Anderson seems to have been so dissatisfied about it that he has left it out altogether. But there is a piece of the same thing mixed in Wallich's herbarium with *Ruellia Cephalotes* (Wall. Cat. 2352, type sheet); and it is probably an alpine starved (or cultivated ?) form of *S. pentstemonoides*.

93. **S. Dalhousianus,** *Clarke*; leaves elliptic acuminate at both ends hairy, bracts orbicular concave whitened glabrous, bracteoles 0, calyx glabrate or sparingly hairy, corolla nearly 2 in. glabrous purple. S. pentstemonoides, *T. Anders. in Journ. Linn. Soc.* ix. 477, *partly*. Goldfussia Dalhousiana, *Nees in DC. Prodr.* xi. 174; *Wight Ic.* t. 1509.

W. TEMPERATE HIMALAYA, alt. 6–8000 ft.; from Kashmir to Kumaon, frequent; *Lady Dalhousie, Thomson*, &c.

A suberect shrub, 2–3 ft.; stems hairy. *Bracts* scarcely ½ in., caducous; outermost oblong, green upwards, small, not enclosing the heads. *Calyx* in the typical form glabrous, subscarious, lobes linear-oblong, sometimes minutely softly hairy.—United with *S. pentstemonoides* by T. Anders., from which it differs in habit, in having much more hairy leaves and less hairy calyx. It also grows at a different level.

94. **S. multidens,** *Clarke*; leaves ovate shortly acuminate at both ends minutely sparsely hairy on both surfaces, heads panicled viscous hairy, bracts small obovate viscous hairy deciduous, calyx viscous-pubescent, corolla $1\frac{3}{4}$ in. purple.

SIKKIM, alt. 3–6000 ft.; *J. D. H.*, &c. BHOTAN; *Griffith, Herb. Propr.* n. 2398.

Leaves $7\frac{1}{2}$ by 4 in., closely regularly serrate (often with more than 100 teeth to the leaf; both surfaces with few remote minute hairs and small scattered raphides. *Bracts* $\frac{1}{4}$ in., very viscous-hairy; bracteoles $\frac{1}{6}$ in., linear-oblong. *Capsule* $\frac{3}{4}$ in., viscous-pubescent, 4-seeded. *Seeds* $\frac{1}{3}$ in., subquadrate, fulvous-hairy; areoles subobsolete.—This is the so-called Sikkim *S. Dalhousianus*; it is nearer the true *S. pentstemonoides*, but the young heads are never glabrous globose as in that, and the panicle is compound very glandular-hairy. The corollas in Griffith's Bhotan example are not more than $1\frac{1}{4}$ in., but are not thoroughly expanded.

95. **S. rhombifolius,** *Clarke*; leaves subsessile rhomboid-ovate shortly acute at both ends glabrous, bracts small elliptic concave caducous, bracteoles 0, corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. nearly glabrous. Goldfussia sessilis, *Nees in DC. Prodr.* xi. 172, *not Strobilanthes sessilis, Nees.*

ASSAM; *Jenkins.*

Branches long, subterete, glabrous. *Leaves* (often unequal) $3\frac{1}{2}$ by 2 in., remotely serrulate, lineolate on both surfaces; nerves 5 pair. *Peduncles* 1–3 in., 1–3-headed; heads $\frac{1}{2}$ in. diam., closely capitate; all the bracts early caducous. *Calyx* in flower $\frac{1}{4}$–$\frac{1}{3}$ in., divided nearly to the base; segments narrowly lanceolate, fuscous pubescent. *Corolla* nearly as of *S. pentstemonoides*, purple-mouthed. *Filaments* glabrous, longer hairy near the base. *Capsule* not seen.—This seems very near *S. pentstemonoides*, differing little but in the shape of the leaves; the heads however, by the time the first flowers expand, have lost all their bracts, which gives them a very different look.

96. **S. oligocephalus,** *T. Anders. ms. in Herb. Kew*; leaves elliptic caudate-acuminate nearly glabrous ciliate, young heads globose, bracts round concave glabrous, bracteoles 0, calyx hairy, corolla $1\frac{1}{4}$ in. pubescent without dark-purple.—Goldfussia sp. n. 24, *Herb. Ind. Or. H. f. & T.*

UPPER SIKKIM, alt. 5–7000 ft.; Yoksun, *J. D. H.*, &c.

A small shrub, 1–2 ft.; branches slender, terete, glabrous. *Leaves* attaining $6\frac{1}{2}$ by 3 in. (usually smaller much narrower), base cuneate, minutely remotely denticulate, sparingly thinly lineolate, sparsely puberulous especially toward the margins beneath; nerves 5–6 pair; petiole $\frac{3}{4}$ in. *Bracts* as in *S. pentstemonoides*, but rather smaller. *Corolla* viscous-pubescent without, usually nearly black.—When dried hardly distinguishable from *S. pentstemonoides* but by the smaller heads and the ciliate leaves.

VAR.? *Treutleri*; heads slightly elongate, bracts ovate-lanceolate herbaceous hairy, bracteoles $\frac{1}{6}$ in. linear, sepals $\frac{2}{3}$–$\frac{3}{4}$ in.—Sikkim, alt. 9–10,000 ft., frequent on Tonglo and Sundukphoo, *Treutler*, &c.

97. **S. dasyspermus,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 94; leaves elliptic or ovate acuminate very sparsely minutely hairy, heads even in fruit capitate forming (by the falling of the floral leaves) quasi-panicles, bracts small oblong caducous, corolla 1 in. blue glabrous without.

PEGU; *Kurz.*

An erect, nearly glabrous herb, 3–4 ft. (Kurz); branches obscurely quadrangular. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base suddenly shortly acuminate (the uppermost and reduced floral leaves sessile cordate), crenate-serrate, subglabrous, minutely lineolate above; nerves 7–8 pair; petiole 0–$\frac{1}{3}$ in. *Heads* few-fld., glandular-hairy; peduncles $\frac{1}{3}$–$\frac{2}{3}$ in.; bracts $\frac{1}{4}$ in.; bracteoles $\frac{1}{8}$ in., obovate-oblong, caducous. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., divided nearly to the base; segments linear-ligulate. *Corolla* nearly straight; cylindric base

about as long as the moderately-widened ventricose part; segments ovate. *Filaments* and *style* sparsely hairy. *Capsule* ⅓ in., narrowly elliptic, pubescent upwards, 4-seeded. *Seeds* ⅛ in., ovate, silky; areoles hardly any.—Kurz rightly refers this to the neighbourhood of *S. pentstemonoides.*

98. **S. discolor,** *T. Anders. in Journ. Linn. Soc.* ix. 477; leaves elliptic cuspidate-acuminate glabrous, heads cymose running into compound panicles, bracts fugacious, calyx hairy, corolla 1¼ in. nearly glabrous. Goldfussia discolor, *Nees in DC. Prodr.* xi. 172 (excl. West Himalayan examples).

BHOTAN, ASSAM, and KHASIA MTS.; *Griffith* (*Herb. Propr.* nn. 2399, 2400; Kew Distrib. nn. 6105, 6120).

A shrub, closely resembling *S. pentstemonoides* and *S. sessilis*; differing from the former in having the leaves more shortly petioled, less sharply toothed, the inflorescence more compound; from the latter in the leaves cuspidate acuminate. In the type examples of Nees the leaves are scarcely whitened beneath. *Bracts* not seen, oblong-lanceolate, *fide Nees.*

VAR. *nudicalyx*; leaves densely lineolate above coriaceous very white beneath, bracts ¼ in. obovate, sepals glabrate lineolate. Goldfussia sp. n. 25, *Herb. Ind. Or. H. f. & T.*—Khasia, alt. 4000 ft.; Mausmai Falls, *Griffith* (Kew Distrib. n. 6120); Cherra, *H. f. & T.*—The type examples of this collected by J. D. H. look like a very distinct species; but some of the pieces of Griffith have the sepals glandular hairy.

99. **S. isophyllus,** *T. Anders. in Cat. Hort. Calcutt.* 43, and in *Journ. Linn. Soc.* ix. 478; leaves linear-lanceolate attenuate at both ends glabrous, heads numerous small cymed, bracts elliptic obtuse green shorter than the calyx, bracteoles nearly as long as the bracts, corolla 1 in. nearly glabrous lavender. Goldfussia isophylla, *Nees in Wall. Cat.* 7162, and in *Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 176; *Bot. Mag.* t. 4363; *Maund Bot.* t. 244. Strobilanthes Goldfussia, *Dalz. & Gibs. Bomb. Fl. Suppl.* 71, *excl. syn.*

KHASIA MTS., or adjoining parts of Silhet or Assam. All the examples are of cultivated plants.

A nearly glabrous, erect, very ramous shrub, 1–2 ft. *Leaves* 3 by ⅓–½ in., opposite, subequal, entire or slightly serrulate, covered with raphides on both surfaces; nerves 4–5 pair; petiole 0–¼ in. *Heads* ½ in. diam., 1–4-fld., terminal but appearing axillary cymed, the reduced leaves on the short axillary branches being caducous; bracteal leaves to the heads caducous; bract ⅓ in., green, nearly glabrous, subpersistent; bracteoles ⅓ in., linear-oblong, green, nearly glabrous. *Calyx* ¼ in., divided nearly to the base, pubescent; segments sublinear. *Corolla* curved; cylindric base much shorter than the ventricose portion, lobes short round. *Stamens* and *style* hairy. *Capsule* nearly ⅓ in., glabrous, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovate, silky; areoles hardly any.

100. **S. anisophyllus,** *T. Anders. in Cat. Hort. Calcutt.* 43, and in *Journ. Linn. Soc.* ix. 478; leaves very unequal or pseudo-alternate lanceolate acuminate at both ends glabrous, heads small often cymed, bracts elliptic obtuse green about as long as the calyx, bracteoles rather shorter than the bracts, corolla 1¼ in. nearly glabrous lavender. Ruellia anisophylla, *Wall. Cat.* 2349; *Hook. Fl. Exot.* t. 191. R. persicifolia, *Griff. Itin. Notes,* 70; *Bot. Reg.* t. 955. Goldfussia anisophylla, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 176; *Bot. Mag.* t. 3404.

KHASIA MTS., alt. 1–4000 ft., common; *Wallich, &c.*

A shrub, 2–3 ft. *Leaves* 3½ by ⅝–1 in.; the opposite leaf of each pair 1¼ by ⅙ in. or obsolete.—Except in the unequal, rather broader leaves, this wholly agrees with

S. isophyllus; and as *S. isophyllus* cannot be found wild, it may prove to be a reversionary (under cultivation) form of *S. anisophyllus.*

101. **S. cratægifolius,** *T. Anders. in Journ. Linn. Soc.* ix. 477; leaves subsessile elliptic or obovate crenulate glabrous, heads 1–5-fld. terminal solitary on numerous short leafy lateral branches hairy, bracts and bracteoles linear-oblong about as long as the calyx, corolla 1¼ in. blue.

MOULMEIN; *Griffith, Parish.*

Branches elongate (15 in. at least), glabrous, subsimple with numerous shortened small-leaved lateral branches in opposite pairs each terminated by a flower-head. *Leaves* 2¼ by 1 in. (those on the lateral branches ¼–½ in.), lineolate above, pale leathery beneath; nerves 6 pair. *Peduncles* 0–⅓ in.; bract ⅙–½ by ⅛ in., green, prominently white-ciliate; bracteoles similar to, rather smaller. *Sepals* ⅓ in., linear-lanceolate, green, ciliate, ½ in. in fruit. *Corolla* nearly straight, glabrous; cylindric base much shorter than the ventricose portion. *Capsule* ½ in., broadly clavate-elliptic, minutely pubescent, 2-seeded. *Seeds* ⅕ in., fulvous-shaggy; areoles very small.

** *Heads elongate mostly interrupted below, frequently all the flowers scattered or only a few at the tips of the spikes capitellate.*

102. **S. lamiifolius,** *T. Anders. in Journ. Linn. Soc.* ix. 476, *partly*; leaves ovate acute nearly glabrous, young heads strobilate, bracts ovate acute scarcely pubescent, bracteoles oblong about as long as the calyx, corolla 1¼–1½ in. nearly glabrous. Ruellia rotundifolia, *Don Prodr.* 120. R. lamiifolia, *Wall. Cat.* 2347. Goldfussia lamiifolia, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 172.

NEPAL; *Wallich.*

Stems 15 in., flexuose, glabrous. *Leaves* 2 by 1¼ in., base rounded or shortly acuminate, serrate, minutely pubescent on the nerves beneath, lineolate on the upper surface; nerves 6–7 pair; petiole ⅓ in. *Spikes* peduncled, mostly solitary, 1 in. in flower scarcely 2 in. not interrupted in fruit; bracts ½ in.; bracteoles ⅓ in., caducous. *Calyx* ⅓ in., in fruit ½ in., divided nearly to the base; segments linear-lanceolate, pubescent. *Corolla* purple (Nees). *Capsule* ½ in., pubescent, 4-seeded. *Seeds* ⅛ in., ovate, silky; areoles hardly any.

103. **S. pauper,** *Clarke*; leaves lanceolate acuminate at both ends puberulous beneath or glabrate, heads oblong in fruit interrupted small or 1-fld., bracts obovate quadrate shorter than the calyx, corolla 1½ in. purple. S. lamiifolius, *T. Anders. in Journ. Linn. Soc.* ix. 476, *partly.*—Goldfussia sp. n. 26, *Herb. Ind. Or. H.f. & T.*

KHASIA MTS., alt. 4–6000 ft.; Nunklow and Nungbree, *H.f. & T.*, &c.

A meagre shrub, 1–2 ft.; branches upwards hairy or glabrate. *Leaves* 3½ by ¾–1 in., minutely toothed or subentire, densely obscurely lineolate; nerves 6–7 pair; petiole ½–1 in. *Spikes* in fruit sometimes 2 in., usually shorter, or the flowers occasionally nearly all solitary; bracts scarcely ¼ in., tip obtusely triangular, green, subpubescent, caducous; bracteoles ⅙ in., oblong, caducous. *Calyx* ¼ in., in fruit ⅓ in., sub-5-partite; segments linear-spathulate, glandular-pubescent. *Corolla* nearly glabrous; narrow cylindric base nearly as long as the ventricose part. *Stamens* glabrous. *Capsule* ½ in., pubescent, 4-seeded. *Seeds* $\frac{1}{10}$–⅛ in., ovate, shaggy; areoles small.

104. **S. extensus,** *Nees in DC. Prodr.* xi. 195; leaves subsessile ovate acuminate hairy base rounded or cordate, spikes long interrupted below, bracts ovate, corolla 1¼–1½ in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc.* ix. 476. Goldfussia extensa, *Nees in Wall. Cat.* 7160, and in *Wall. Pl. As. Rar.* iii. 88.

KHASIA MTS., alt. 4–6000 ft., common; *Wallich*, &c. ASSAM; *Griffith, Mrs. Mack.*

An erect shrub, 1–2 ft.; branches hairy. *Leaves* 1½ by ¾ in., upper cordate sessile, lower sometimes short-petioled, serrate; nerves 5 pair, springing near the leaf-base. *Spikes* 2–6 in., terminal, hairy, dense at the tip, usually much interrupted below; the lowest flowers often distant solitary in the axil of altogether leaf-like persistent bracts; bract proper ¼–⅓ in., herbaceous, glandular, deciduous; bracteoles ⅛ in., elliptic. *Calyx* ⅓–½ in. (or more in fruit), divided nearly to the base; segments linear-oblong, subobtuse, glandular-pubescent. *Corolla* curved; narrow cylindric base of the tube hardly so long as the ventricose part. *Filaments* glabrous; style thinly hairy. *Capsule* ½–⅝ in., glandular-pubescent, 4-seeded. *Seeds* ⅛ in., ovate, hairy; areoles small.

105. **S. phyllocaulos,** *Clarke*; leaves short-petioled ovate acute hairy, spikes long dense interrupted below in fruit, bracts ovate, corolla 1¼ in. nearly glabrous purple.

KHASIA MTS., alt. 5000 ft.; Moflong, *J. D. H.*; Dingling, *Clarke.*

Stems stout, hairy; internodes not half as long as the leaves. *Leaves* 3½ by 1½ in., without the acumination characteristic of *S. extensus*, base of the lower leaves shortly acuminate, serrations often 40–50 to the leaf (rarely 20 in *S. extensus*), upper surface softly densely adpressedly hairy, lower softly patently hairy reticulately nervose; nerves 8 pair, subequally distant (not all springing near the base of the leaf). *Inflorescence, flowers* and *capsule* exactly as of *S. extensus.*—So unlike *S. extensus* in its densely leafy stem that it has been sorted in the Herbarium with *Æchmanthera leiosperma*, which it exceedingly resembles; but it is difficult to separate it from *S. extensus* by any technical character.

106. **S. Newii,** *Beddome ms.*; leaves petioled ovate acute pubescent, spikes much interrupted panicled, bracts lanceolate, corolla 1¼–1½ in. nearly glabrous purple. S. extensus, *Bedd. Ic. Pl. Ind. Or.* t. 202, *not of Nees.*

W. MYSORE; Manjeerabad, *New* (fide Beddome).

A small shrub; branches puberulous, glandular hairy towards the tips. *Leaves* 2 by 1¼ in., base rounded or subcordate, serrate, puberulous scabrous above pubescent beneath; petiole ⅛–⅙ in. (uppermost leaves sessile). *Panicles* 6–10 in.; flowers nearly all opposite distant. *Calyx* and *corolla* nearly as of *S. extensus.*—Col. Beddome published this as *S. extensus*, to which it is no doubt closely allied, but the leaves will not match, and the bracts are totally different, very hairy, early caducous, the bracteoles subobsolete.

107. **S. alatus,** *Nees in DC. Prodr.* xi. 194; leaves petioled ovate acute hairy, spikes early panicled, flowers all distant, bracts narrowly oblong caducous, corolla 1¼ in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc.* ix. 476 (*excl. Sikkim examples*). S. reflexus, *Nees l. c.* 194. S. attenuatus, *Nees l. c.* 193 (*excl. syn.*). Ruellia urticifolia, *Wall. Cat.* 2346.

W. TEMPERATE HIMALAYA, alt. 6–10,000 ft., common; from Kashmir to Kumaon.—DISTRIB. N.E. Cabul.

A shrub, 2–4 ft., erect, viscous-hairy. *Leaves* 5 by 2¾ in., upper sessile, lower long-petioled, base cordate rounded or attenuate, serrate; nerves 7–8 pair; petiole 1–3 in., linear or winged upwards. *Spikes* (by the early fall of the bracts) forming terminal panicles; upper flowers soon in distant pairs, not capitate; bracts narrow-lanceolate or oblong, caducous; upper hardly so long as the calyx; bracteoles ⅛ in., narrowly oblong, caducous. *Calyx* ¼–⅓ in., deeply divided; segments unequal, linear, obtuse, green, viscous-hairy. *Corolla* ventricose, mouth curved, constricted base hardly longer than the calyx, 2 hairy lines within. *Stamens* glabrous. *Ovary* glandular, style very remotely minutely hairy. *Capsule* ¾ in., narrowly elliptic, glandular-hairy,

4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, shaggy; areoles hardly any.—The lower long-petioled leaves are usually cordate, but leaves acuminate at the base occur on the same plant. The species is better distinguished by the tips of the spikes having the flowers (quite early) spicate not capitate, and all the bracts very narrow; but the leaves about the base of the panicle are cordate ovate acuminate. Nees has written this species up under 3 names in the Kew Herbarium: as *S. alatus*, which is altogether right; as *S. attenuatus*, which is erroneous so far as he doubtfully meant it for *Ruellia attenuata*, Wall. & Nees (an *Echinacanthus*); and as *S. extensus*, which is a blunder.

108. **S. Lachenensis,** *Clarke*; leaves ovate attenuated at the base laxly hairy, spikes long interrupted at the base, bracts sessile elliptic truncate at the base exceeding the calyx caducous, corolla middle-sized glabrate without.

SIKKIM HIMALAYA; Lachen, alt. 10,000 ft., *J. D. H.*

Branches elongate, with lax white patent hairs. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse or triangular, base (even in the uppermost) acuminate, decurrent. *Spikes* 2–5 in., solitary, simple; lower bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., green, entire, exactly truncate, not at all cordate. *Corolla* (not expanded) $\frac{2}{3}$ in., with a few scattered lax hairs towards the apex without.—This has been referred as a Sikkim form to *S. alatus*, to which it is certainly allied; but no one of the numerous examples of *S. alatus* will it match even reasonably well.

109. **S. collinus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 192; leaves large elliptic acuminate glabrous, spikes forming thin terminal pubescent panicles, bracts narrowly elliptic overtopping the calyx, corolla 2 in. nearly glabrous. *T. Anders. in Journ. Linn. Soc.* ix. 476. Ruellia collina, *Wall. Cat.* 2343.

PENANG; *G. Porter.*

Branch-tips stout, glabrous; internodes elongate. *Leaves* $9\frac{1}{2}$ by $3\frac{1}{2}$ in., base cuneate, repand-crenate, bearing raphides on both surfaces; nerves 7 pair; petiole $\frac{2}{3}$ in. *Spikes* 3–4 in., with few flowers in remote opposite pairs, early running into a few-branched panicle; bracts $\frac{1}{2}$ in., concave; bracteoles 0. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided nearly to the base; segments linear, with weak subulate pubescent tips. *Corolla* slightly curved, cylindric base as long as the ventricose part. *Capsule* $\frac{2}{3}$ in., clavate-oblong, puberulous, 4-seeded. *Seeds* $\frac{1}{6}$ in., ovate, shortly fulvous-hairy; areoles small. —Habit and calyx much like those of the large *Asystasias*, but the capsule and seeds are of *Strobilanthes*.

110. **S. lancifolius,** *T. Anders. in Journ. Linn. Soc.* ix. 480; leaves elliptic acuminate at both ends glabrous, spikes linear interrupted hairy collected into terminal panicles, bracts oblong obtuse green shorter than the calyx deciduous, corolla $1\frac{3}{4}$ in. minutely pubescent without deep-blue.

MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

A shrub; branches terete. *Leaves* 7 by 3 in., widest about the middle, serrate, minutely lineolate above; nerves 7–8 pair; petiole 1 in. *Spikes* ascending, straight; flowers nearly all in opposite pairs; bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; bracteoles $\frac{1}{4}$ in., linear-oblong, obtuse, deciduous. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., subequally divided nearly to the base; segments linear-oblong, obtuse, pubescent. *Corolla* nearly straight, funnel-shaped, ventricose upwards; segments ovate, dense rows of long white hair within. Longer *filaments* white hairy. *Capsule* $\frac{2}{3}$ in., glabrate, 4-seeded. *Seeds* shaggy.

111. **S. denticulatus,** *T. Anders. in Journ. Linn. Soc.* ix. 483; leaves long-petioled elliptic acuminate at both ends fuscous-pubescent on the nerves beneath, spikes linear interrupted fuscous-pubescent, flowers (or many of them) in distant pairs, bracts lanceolate. Ruellia denticulata, *Wall. Cat.* 2418. Asystasia denticulata, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164.

KHASIA MTS.; *Wallich.* PATKOYE MTS. (in S.E. Assam), at the river Namyoon (by error Kamyoon in Griffith's Journals); *Griffith* (Kew Distrib. n. 6112).

A shrub; branches quadrangular, scabrid puberulous upwards. *Leaves* 6 by 2½ in., crenulate-dentate, with small raphides on both surfaces, paler beneath; nerves 12 pair; petiole ⅛–3 in. (often very unequal in the opposite pairs). *Spikes* 1–4 in., axillary, 1 or 2 together, interrupted, slender even before flower-time; bracts ¼–⅓ in., green, slightly pubescent; bracteoles ⅕ in. *Calyx* ¼–⅓ in., divided nearly to the base; segments lanceolate, scarcely acute, fuscous-pubescent. *Corolla* 1¼ in., pubescent without, nearly straight; linear-cylindric part of the tube nearly as long as the ventricose part. *Filaments* very hairy (Nees). *Capsule* not seen.

112. **S. microcarpus,** *T. Anders. in Journ. Linn. Soc.* ix. 482; leaves large petioled ovate acuminate coarsely serrate hirsute on both surfaces, flowers panicled distant mostly in opposite pairs, bracts and bracteoles very small, corolla ¾ in. glabrous without.

TENASSERIM or ANDAMANS; *Helfer* (Kew Distrib. n. 6113).

A shrub; branches terete, swollen at the nodes, glabrous. *Leaves* 8 by 4½ in., base broadly rhomboid, hirsute with white hairs which are stellately clustered on the upper surface, closely minutely lineolate on both surfaces; nerves 15 pair; petiole 1½–2 in. *Inflorescence* viscidly glandular-hairy; spikes proper apparently laxly few-fld., axillary and running into a terminal panicle; bracts ⅕ in., linear; bracteoles similar to the bracts. *Calyx* ⅓ in., divided nearly to the base, viscous; segments linear, more or less unequal. *Corolla* nearly straight, very hairy within; cylindric base much shorter than the ventricose portion; segments short. *Capsule* scarcely ⅓ in., clavate, 2-seeded where examined.—Helfer's examples are in bad condition, with the leaves (both cauline and floral) all detached; and the species very possibly is not placed here correctly.

113. **S. angustifrons,** *Clarke*; leaves elliptic acuminate at both ends nearly glabrous, spikes lateral and terminal paniculate with capitellate tips, bracts oblong acuminate caducous, corolla 1½ in. nearly glabrous purple.—Strobilanthes sp. n. 29, *Herb. Ind. Or. H. f. & T., partly.* Goldfussia Edgeworthiana, *Nees in DC. Prodr.* xi. 173?

N.W. HIMALAYA; Deyra, alt. 2500 ft., *Thomson*; Kangra and Dhurmsala, alt. 3–6000 ft., *Clarke.*

A suberect shrub, 2–3 ft.; branches glabrous. *Leaves* 4½ by 1¾ in., upper all attenuate at the base, serrulate, upper surface and margin minutely hairy or glabrous, raphides small on both surfaces; nerves 6 pair; petiole ½ in. *Spikes* forming short irregular panicles, branches nearly glabrous; lower bracts leaf-like, lanceolate (base never cordate), upper shorter than the calyx; bracteoles ⅙ in., linear, scarcely pubescent. *Sepals* ⅓–½ in., linear, pubescent. *Corolla* nearly as of *S. alatus*, but much narrower. *Capsule* ⅓–½ in., sparsely pubescent, 4-seeded. *Seeds* scarcely ⅛ in., orbicular, hairy; areoles hardly any.—This differs from *S. alatus* by the slenderer corolla, capsule and seeds, and by the uppermost leaves being narrowed never cordate at the base.

114. **S. agrestis,** *Clarke*; leaves ovate acuminate at both ends sparsely hairy on both surfaces, spikes elongate paniculate with capitellate tips, bracts shorter than the calyx obovate pubescent caducous, corolla 2 in. glabrous without.

SUBTROPICAL SIKKIM and W. BHOTAN, alt. 2–5000 ft., frequent; *Clarke.*

An erect, branched undershrub, 1–2 ft.; branches upwards quadrangular, pubescent. *Leaves* 4 by 2 in., often unequal, shortly acuminate at the base, serrulate, shortly sparsely hairy above, minutely pubescent beneath, minutely lineolate on both surfaces; nerves 6 pair; petiole ¼–½ in. *Spikes* 1–4 in., hairy, lower flowers in distant pairs; bracts ¼ in.; bracteoles ⅙ in., linear-oblong. *Corolla* slightly curved, rather narrowly tubular-ventricose, lavender colour. *Capsule* and *seeds* as of *S. angustifrons,* to which it is nearly allied.

VAR. *hemiotis*; one leaf of every pair sessile cordate less than ¼ the length of the other.—Khasia Mts., *Herb. Watt.*

115. **S. Thomsoni,** *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves ovate or elliptic acuminate at both ends glabrous, spikes short cymose or fascicled axillary shorter than the leaves glabrous or viscous-hairy, bracts and bracteoles very small, corolla 1¼ in. purple.—Strobilanthes sp. n. 30, *Herb. Ind. Or. H.f. & T.*

SUBTROPICAL SIKKIM and W. BHOTAN, alt. 2–6000 ft., common; *J. D. H., T. Anders.*, &c.

A shrub, 3–5 ft.; branches elongate, flexuose, glabrous. *Leaves* 4½–6½ by 2½ in., serrate, with small raphides on both surfaces; nerves 6 pair; petiole ½–¾ in., sometimes 0. *Spikes* 1–3 in., in nearly all the axils, densely divided from the base, the flowers nearly all in crowded but distinct opposite pairs; lower bracts resembling reduced leaves, lanceolate; upper ⅙ in. spathulate, glabrous pubescent or very viscous-hairy. *Calyx* in flower often less than ⅕ in., in fruit sometimes nearly ½ in., divided nearly to the base; segments equal or unequal, glaucous or green, hairy. *Corolla* somewhat curved, minutely pubescent, ultimately glabrate. *Capsule* scarcely ⅓ in., minutely pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., orbicular, innumerable fine white hairs springing out on applying water; areoles very small.—There is a wide series of forms here collected, varying much in the size and hairiness of the calyx, but all remarkable by the fasciculate axillary inflorescence. Possibly T. Anderson also included here *S. agrestis*, which has different inflorescence, and much larger capsules.

116. **S. lævigatus,** *Clarke*; nearly glabrous, leaves elliptic acuminate at both ends serrate, flowers loosely panicled nearly all in opposite distant pairs, bracts very caducous, corolla 1¾ in. nearly glabrous.

SIKKIM; *J. D. H.*

A shrub, glabrous except a few glandular hairs occasionally on the calyx and panicle-rachis. *Leaves* 7 by 2½ in., sharply serrate, obscurely lineolate, nerves 8 pair; petiole ¾ in. *Panicles* axillary and terminal, large, lax; bracts and bracteoles all fallen before some of the corollas have opened. *Calyx* ⅓ in., divided nearly to the base; segments subequal, narrowly lanceolate, subobtuse, somewhat enlarged, membranous in fruit. *Corolla* nearly as of *S. angustifrons* & *agrestis*. *Capsule* ½–⅔ in., glabrous, tip obscurely glandular.

117. **S. debilis,** *Clarke*; leaves small elliptic sparsely hairy, spikes small interrupted, flowers in opposite pairs, bracts linear-lanceolate, corolla 1 in. nearly glabrous without long white-hairy within.

PEGU; *Kurz.*

Stem creeping, rooting; flowering branches 4–8 in., erect, branching, pubescent. *Leaves* 1½ by ⅔ in., apex triangular, very obtuse, base cuneate, undulate or crenate, densely lineolate and with a few long multicellular hairs above, pubescent beneath; nerves 5 pair; petiole ⅛ in. *Spikes* 1–2 in., weak, hairy; bracts ⅓ in.; bracteoles ¼–⅓ in., linear, green, hairy. *Sepals* ¼–⅓ in., linear, subulate, very hairy. *Corolla* nearly straight; cylindric base hardly half as long as the urceolate part; segments 5, short, round, subequal. *Filaments* glabrous. *Ovary* 4-ovulate. *Capsule* not seen.—A very anomalous species; it is possible that the bracts are not caducous, and that it should not be arranged here.

118. **S. glandulosus,** *Kurz in Journ. As. Soc.* 1873, ii. 92; viscous, leaves narrowly elliptic repand-crenate, spikes very numerous, lowest bracts leaf-like subpersistent, proper bracts small oblong caducous, corolla scarcely ⅓ in. yellow. Hemigraphis glandulosa, *T. Anders. in Kurz Andaman Rep. App.* B. 13.

S. ANDAMAN ISLANDS; *Kurz.*

A branched herb (*Kurz*). *Leaves* 3 by 1 in., subobtusely cuneate at both ends nearly glabrous; nerves 6 pair; petiole ¼ in. *Inflorescence* exceedingly sticky, very compound; lower bracts persistent, or deciduous forming the spikes into compound panicles; flowers distant in opposite pairs, or in small heads; or in appearance solitary,

terminal, pedicelled. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided nearly to the base; segments linear. *Corolla* straight, tubular-ventricose, hardly $\frac{1}{8}$ in. diam.; segments short, round. *Filaments* and *style* glabrous; ovary 4-ovulate. *Capsule* $\frac{1}{3}$ in., clavate, compressed, pubescent, 4-seeded. *Seeds* $\frac{1}{12}$ in., orbicular; when wetted the fine hairs spring out; areoles very small.—Kurz, after removing this species to *Strobilanthes*, suggests that it is allied to *Hemigraphis Griffithiana*, of which not merely the ovules, but the inflorescence, &c., are totally different.

119. **S. secundus,** *T. Anders. in Journ. Linn. Soc.* ix. 480; leaves elliptic acute at both ends nearly glabrous, spikes lax long, flowers distant in opposite pairs, bracts petioled ovate deciduous, corolla $1\frac{1}{2}$ in. minutely pubescent without yellow with a brown-purple tube.—Strobilanthes sp. n. 23, *Herb. Ind. Or. H. f. & T., partly.*

MISHMEE and ASSAM; *Griffith* (Kew Distrib. n. 6122). ASSAM; *Simons.*

Leaves $6\frac{1}{2}$ by 3 in., crenate or subentire, ashy puberulous on the nerves beneath otherwise glabrous, upper surface with minute raphides; nerves 8 pair; petiole $\frac{1}{3}$ in. *Spikes* 12 in., whip-like, sparingly branched (in Griffith's type specimens), sometimes depauperated 3 in., 5-fid.; lower bracts leaf-like, upper gradually smaller, leaf-like, deciduous, uppermost only $\frac{1}{3}$ in., lanceolate; bracteoles obsolete. *Calyx* $\frac{1}{2}$ in., divided nearly to the base, glabrous, enlarged in fruit; segments unequal, narrowly lanceolate, linear-elongate, subobtuse. *Corolla* curved, cylindric base hardly so long as the calyx. *Capsule* nearly 1 in., base long barren narrow, 4-seeded. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., ovate, shaggy; areoles very small.

120. **S. flaccidifolius,** *Nees in DC. Prodr.* xi. 194; glabrous, leaves elliptic acute at both ends, spikes forming somewhat dense panicles, flowers opposite many remote, bracts petioled ovate deciduous, corolla 2 in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc.* ix. 481. S. Championi, *T. Anders. in Benth. Fl. Hongk.* 261. S. flaccidus, *Mann, Assam For. Rep.* 1876-7, par. 135; *Gamble, Man. Ind. Timb.* 280; *Kurz For. Fl.* ii. 239. Ruellia indigofera, *Griff. Trav.* 237. R. indigotica, *Fortune, Resid. Chin.* 158. *Balfour, Cyclop. Ind. IV.* (*Ruellia*). R. Cusia, *Ham. in Wall. Cat.* 2386. Goldfussia Cusia, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175. Dipteracanthus ? calycinus, *Champ. in Hook. Kew Journ.* v. 133.

N. and E. BENGAL with ASSAM, alt. 1–4000 ft. in the lower hills, often cultivated, *Hamilton, Griffith,* &c.—DISTRIB. N. Burma, S. China.

A shrub. *Leaves* and *flowers* closely resembling (when dry) those of *S. secundus,* but the inflorescence denser, the flowers rather larger. *Capsule* $\frac{3}{4}$ in., not constricted at the base; lower seeds less than $\frac{1}{4}$ in. from the base.—Except as to the capsule, this looks exceedingly like a cultivated form of *S. secundus.* Yields the dye "Room."

Series C. *Alterniflorœ.* *Bracts* persistent or caducous, large or small, in opposite pairs (sometimes unequal) one of each pair mostly barren. *Spikes* linear lax usually interrupted often flexuose, zigzag or twisted, or compound passing into much-branched panicles; spikes upwards at least generally sympodal. *Flowers* mostly distant, alternate.—(Several species in this section have *some* of their flowers opposite, but these are in such case often twisted much to one side; and in many cases where such occur as solitary in the axils of leaves, they are really alternate on shortened axillary branches with 2 opposite bracts, whereof one only contains a flower.) —Species of N. India and the Malay Peninsula.

121. **S. divaricatus,** *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves lanceolate or elliptic acuminate at both ends glabrous, spikes axillary and terminal elongate flexuose or zigzag, flowers distant both paired and alter-

nate, bracts very small caducous, corolla 1½ in. nearly glabrous purple. Ruellia divaricata, *Wall. Cat.* 2372. Goldfussia divaricata, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 176.—Strobilanthes sp. n. 23, *Herb. Ind. Or. H.f. & T., partly.*

TEMPERATE HIMALAYA, alt. 5–9000 ft., from Nepal to Bhotan, common; *Wallich*, &c. KHASIA MTS., alt. 3–5000 ft., frequent; *H.f. & T.*, &c.

A shrub, 2–5 ft., nearly glabrous. *Leaves* 5¼ by 2 in. (in the Himalaya plant usually narrower), serrulate, obscurely setulose; nerves 7 pair; petiole ⅓ in. *Spikes* very lax, divaricate; glabrous or (in the Khasia form) thinly hairy upwards. *Bracts* ⅛ in., ovate, caducous; bracteoles ⅛–⅙ in., obovate-oblong, caducous. *Calyx* ⅓-1 in., subequally divided to the base; segments narrow elongate caudate, often glabrous in the Himalaya form, usually hairy (sometimes very hairy in fruit) in the Khasia form. *Corolla* curved, tubular, ventricose, subviscid dark purple, glossy in the high-level Himalaya plant. *Stamens* glabrous or the filaments minutely pubescent at the base. *Capsule* ½ in., glabrate, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovate, pubescent; areoles small.

122. **S. rubescens,** *T. Anders. in Journ. Linn. Soc.* ix. 479; lower leaves subsessile oblong acuminate subentire coriaceous hairy or glabrate, spikes curved, flowers mostly remote not opposite, bracts very small ovate, corolla nearly 2 in., seeds ⅙ in.—Goldfussia sp., *Griff. Itin. Notes,* 20, n. 309. Goldfussia sp. n. 27, *Herb. Ind. Or. H.f. & T., in great part.*

KHASIA and JAINTEA MTS., alt. 3–5000 ft., common; *Griffith, H.f. & T.*, &c.

Suberect flexuose, or lax curved, 1–2 ft., hairy or glabrous. Lower *leaves* 3½ by 1¼ in. with petiole rarely ⅙ in., upper cordate sessile, sparsely lineolate above; nerves 5 pair. *Spikes* 1–5 in., axillary, and forming a quasi-terminal panicle, secund, glabrous or sparingly glandular-hairy; bracts scarcely ⅛ in., ovate, opposite, usually only one bearing a flower; bracteoles nearly as long as the bracts, linear. *Calyx* ⅓–½ in., divided nearly to the base; segment linear-lanceolate, somewhat enlarged in fruit. *Corolla* nearly straight, glabrous, purple or lilac; cylindric base ⅓ in., ventricose part 1 in. *Capsule* ½–⅔ in., glabrous, 4-seeded. *Seeds ovate, shaggy principally on the margin;* areoles small.

VAR. ? *microsperma*; leaves more distinctly serrate lower sessile cordate, capsule scarcely ⅓ in., seeds $\frac{1}{10}$ in.—Khasia Mts., alt. 4–5000 ft., *H.f. & T.* Darjeeling; Jor Bungalow, alt. 7500 ft., *Beddome.*—The small seeds appear perfectly ripe. Col. Beddome's Darjeeling plant may be a new species.

123. **S. boerhaavioides,** *T. Anders. in Journ. Linn. Soc.* ix. 479; lower leaves long-petioled ovate acuminate crenate glabrate, spikes curved, flowers mostly remote not opposite, bracts very small ovate, corolla 1½ in., seeds ⅙ in.—Goldfussia sp. n. 27, *Herb. Ind. Or. H.f. & T., in part.*

SIKKIM HIMALAYA; *Thomson.* KHASIA MTS., alt. 4–5000 ft.; Pomrang, *J. D. H.*

Lower leaves 6½ by 3 in.; petiole 1–1½ in., winged upwards. Otherwise so closely resembling *S. rubescens* type, that the species have been thrown into one in Herb. Kew.

124. **S. Helictus,** *T. Anders. in Journ. Linn. Soc.* ix. 479; leaves lanceolate or elliptic acuminate at both ends glabrous, spikes elongate zigzag twisted glabrous or viscous hairy, bracts linear shorter than the calyx, corolla 1¼ in. creamy-white. Ruellia calycina, *Wall. Cat.* 2417. Asystasia calycina, *Nees in Wall. Pl. As. Rar.* iii. 90. Echinacanthus calycinus, *Nees in DC. Prodr.* xi. 168.

SIKKIM, alt. 6000 ft.; *Treutler.* KHASIA and JAINTEA MTS., alt. 4000 ft. frequent; *Griffith*, &c.

A shrub, 1–4 ft.; branches sometimes pubescent upwards. *Leaves* 4½ by 1–1¼ in. lanceolate (in the Sikkim example 4¼ by 2 in. elliptic), serrate; upper surface lineo-

late; nerves 5–9 pair; petiole $\frac{3}{4}$ in. *Spikes* 3–8 in., axillary and terminal, but little branched; flowers all distant alternate; bracts $\frac{1}{3}$–$\frac{1}{2}$ in., unequal, opposite, the smaller one barren; bracteoles $\frac{1}{8}$ in., linear. *Calyx* $\frac{1}{2}$–$1\frac{1}{4}$ in., divided subequally nearly to the base; segments linear, glabrous or very viscous hairy, more or less enlarged in fruit. *Corolla* nearly glabrous, very ventricose from a constricted base scarce $\frac{1}{4}$ in. long; segments short, round. *Stamens* 4, filaments very hairy downwards. *Capsule* $\frac{3}{4}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, pubescent hair at first dense white, ultimately tawny less; areoles very small.—T. Anderson says the leaves are "softly tomentose beneath," which is a mistake.

125. **S. Griffithianus,** *T. Anders. in Journ. Linn. Soc.* ix. 481; leaves broadly lanceolate acuminate at both ends puberulous on the nerves beneath, spikes elongate zigzag viscous pubescent, flowers distant alternate, bracts lanceolate obtuse persistent, corolla $1\frac{3}{4}$ in. yellow. Triænanthus Griffithianus, *Nees in DC. Prodr.* xi. 169.

KHASIA MTS., alt. 2–3000 ft., *Griffith, J. D. H.*, &c., frequent on the southern face.

A spreading shrub, 3–7 ft. diam.; branches fuscous-puberulous upwards. *Leaves* 6 by $1\frac{1}{2}$ in., minutely denticulate; nerves 10 pair; petiole $\frac{3}{4}$ in. *Spikes* 3–8 in., lateral and in lax terminal panicles; bracts 1 in., opposite, more or less unequal, one of each pair supporting a flower; bracteoles $\frac{1}{4}$ in., linear-oblong. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., divided subequally very nearly to the base; segments (one a little longer than the other 4) linear-oblong, green, viscous-pubescent. *Corolla* nearly straight glabrous, yellow with brown or red spots or lines; linear-cylindric base of the tube about as long as the ventricose part. *Filaments* very hairy. *Capsule* $\frac{3}{4}$ in., nearly glabrous, 4-seeded. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., fulvous-hairy; areoles very small.—Nees erected this plant into a genus on the ground that the calyx was 2-lipped with one lip trifid but half-way down; an error of fact.

126. **S. paucinervius,** *T. Anders. in Herb. Kew*; glabrous, leaves elliptic acuminate, spikes linear elongated interrupted flexuose alternate-fld., bracts lanceolate persistent.

TENASSERIM OR ANDAMAN ISLANDS; *Helfer* (Kew Distrib. n. 6115).

Apparently a lax shrub. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base rhomboid, subentire or minutely denticulate, lineolate on both surfaces; nerves 5–6 pair; petiole $\frac{1}{6}$ in. *Spikes* 2–4 in., axillary, short peduncled, 1 or 2 together; bracts $\frac{1}{2}$ in., bracteoles nearly as long, narrower, persistent. *Calyx* subequally 5-fid nearly to the base; segments linear-lanceolate acute. *Capsule* $\frac{3}{4}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{6}$ in., ovate, shaggy; areoles hardly any.

127. **S. elongatus,** *Clarke*; glabrous, leaves lanceolate acuminate, spikes very long lax, flowers alternate and opposite distant, bracts lanceolate persistent, sepals linear-lanceolate rather longer than the bracts.

ASSAM; Namroop, *Griffith* (Kew Distrib. n. 6183).

A shrub. *Leaves* $4\frac{1}{4}$ by $1\frac{1}{4}$ in., base cuneate, minutely serrate, densely lineolate above; nerves 11 pair; petiole $\frac{1}{4}$ in. *Spikes* axillary and quasi-terminal, 1 or 2 together, attaining 7 in., sparingly branched, leafless; bracts in opposite pairs, all distant, both or one or neither bearing a flower, $\frac{1}{3}$ by $\frac{1}{10}$ in.; bracteoles linear, shorter than the bracts. *Sepals* $\frac{1}{3}$ in., glabrous. *Corolla* not seen. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., 4-seeded, glabrous. *Seeds* compressed, orbicular, subelastically hairy.

128. **S. farinosus,** *Clarke*; leaves elliptic acuminate at each end serrate glabrous, spikes in a pubescent panicle, flowers distant alternate, bracts very small persistent, corolla $1\frac{1}{2}$ in. nearly glabrous without.

MOULMEIN; Thoung Yun, *Lobb.*

Branch terete, glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., upper surface lineolate, lower pale; nerves 7 pair; petiole $\frac{1}{2}$ in. *Spikes* axillary, and a terminal panicle 4 in. diam.;

bracts $\frac{1}{3}$ in., elliptic, pubescent, opposite one of each pair usually barren; bracteoles oblong rather longer than the bracts. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided subequally nearly to the base; segments linear-ligulate, softly pubescent, densely white papillose down the back. *Corolla* nearly straight, much ventricose upwards, constricted base of the tube short. *Style* glabrous. *Capsule* $\frac{3}{4}$ in., spathulate-oblong, puberous, 4-seeded. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., ovate, shaggy; areoles very small.—The papillæ on the backs of the sepals (and continued also on the bracts) give this species a powdered or farinose look.

129. **S. nobilis,** *Clarke*; leaves elliptic acuminate at both ends sparsely hairy on the nerves beneath, spikes long flexuose panicled pubescent, flowers alternate, bracts lanceolate acute persistent.

JAINTEA HILLS; Jarain, alt. 3500 ft., *Clarke.*

An erect gregarious shrub, 6–10 ft. *Leaves* 9 by 3 in., unequal-sided, upper sessile, serrate, thinly lineolate above; nerves 10 pair. *Spikes* 6–12 in., hardly interrupted; bracts $\frac{3}{4}$–1 in., very acuminate, minutely hairy; bracteoles $\frac{3}{4}$ in., linear-lanceolate. *Calyx* $\frac{5}{8}$ in., divided nearly to the base equally; segments linear, minutely scabrous-pubescent. *Capsule* $\frac{3}{4}$ in., nearly glabrous, 4-seeded. *Seeds* $\frac{1}{6}$ in., ovate, shaggy; areoles very small.—*Corolla* not preserved, believed to be yellow.

130. **S. inflatus,** *T. Anders. in Journ. Linn. Soc.* ix. 476; villous, leaves elliptic or subovate acuminate, flowers alternate or some opposite in flexuose or twisted 1-sided spikes, lower bracts leaf-like upper spathulate, corolla $1\frac{1}{2}$ in. much curved pubescent without.—Goldfussia sp. n. 28, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5–8000 ft.; *J. D. H.*

Branches woody, flexuose, terete, fulvous-villous. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in., serrate, hairy on both surfaces; nerves 6 pair; petiole $1\frac{1}{4}$ in. *Spikes* 1–3 in., fulvous villous, internodes zigzag or contorted almost as in *S. Helictus*; most of the bracts foliaceous; bracteoles minute linear. *Corolla* funnel-shaped, inflated, tube very much curved towards the top; segments subquadrate orbicular. *Capsule* $\frac{5}{8}$ in., narrowly elliptic, glabrous, 4-seeded. *Seeds* $\frac{1}{6}$ in., subquadrate, shaggy; areoles subobsolete.—Nearly all the bracts are leaf-like, persistent; the uppermost, entirely bracteiform ones, are deciduous.

131. **S. Wallichii,** *Nees in Wall. Pl. As. Rar.* iii. 87, and in *DC. Prodr.* xi. 193; leaves petioled elliptic acuminate nearly glabrous upper sessile cordate, spikes lax 1-sided, flowers solitary or paired, many of the lower bracts large leaf-like, sepals linear subobtuse glabrous in fruit elongate somewhat hairy at the tips, corolla $1\frac{1}{4}$ in. blue. *T. Anders. in Journ. Linn. Soc.* ix. 477. Ruellia alata, *Wall. Pl. As. Rar.* i. 26, t. 31, and *Cat.* 2371 *a.* Goldfussia Thomsoni, *Bot. Mag.* t. 5119, *not Strobilanthes Thomsoni, T. Anders.*

SUBALPINE HIMALAYA, alt. 7–11,000 ft.; from Nepal to Bhotan, common, *Wallich*, &c.

Stems 6–24 in., weak, quadrangular sometimes sharply, glabrous or pubescent on the angles. *Leaves* 3 by 1 in., crenate-serrate, puberulous or glabrate, thinly lineolate above; nerves 6 pair; petiole $\frac{3}{4}$ in. *Spikes* 1–6 in., often flexuose or zigzag, lowest flowers appearing often axillary solitary opposite; bracts (many of the middle ones) ovate or subcordate, altogether resembling the upper leaves; uppermost bracts often small, less than $\frac{1}{4}$ in., ovate or obovate, glabrate; bracteoles linear-oblong, small or 0. *Sepals* in flower $\frac{1}{3}$ in., usually quite glabrous, in fruit often more than 1 in., laxly flexuose, very narrow, usually more or less glandular hairy at least at the tips. *Corolla* nearly straight, glabrous or with minute lines of hairs within; cylindric base about as long as the ventricose portion; segments short, round. *Filaments* and *style* glabrous. *Capsule* $\frac{1}{2}$–$\frac{5}{8}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, pubescent; areoles small.—The lowest flowers often appear axillary opposite, with 2 small ovate bracteoles each: more careful comparison shows that the axillary flower is on a

short axillary branch which has 2 opposite bracts, 1 barren, the other with a flower often supported by the two normal but minute bracteoles.

VAR. *microphylla*, Nees; leaves very thin herbaceous uppermost cuneate or rhomboid at the base, bracts lanceolate or subovate many foliaceous not cordate, sepals in fruit much broader than in *S. Wallichii* type, corolla-mouth much on one side, capsule more than ¾ in., seeds ⅕ in. Ruellia alata, *Wall. Cat.* 2371 *b.*—N.W. Himalaya, alt. 7–11,000 ft.; from Kashmir to Kumaon, common, *Wallich*, &c.—Connected by intermediate forms with the Sikkim type. Leaves often large, sometimes small.

132. **S. atropurpureus,** *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 195; leaves ovate acute coarsely serrate sparsely hairy, spikes lax, flowers solitary or paired, many of the lower bracts leaf-like, sepals linear subobtuse patently hairy, corolla 1¾ in. blue. *T. Anders. in Journ. Linn. Soc.* ix. 477. Ruellia atropurpurea, *Wall. Cat.* 2398.

SUBALPINE W. HIMALAYA, alt. 6–10,000 ft.; from Jamu to Nepal, frequent, *Wallich*, &c.

A perennial, often growing in swamps; stems 1–1½ foot, thick, succulent, hirsute upwards, or dwarfed 3–6 in. Lower *leaves* petioled or the petiole winged to the base. *Corolla* usually much curved, the ventricose part of the tube very broad. Otherwise as *S. Wallichii* var. *microphylla*, of which this species has been treated (perhaps correctly) at Kew as a var.

133. **S. subnudatus,** *Clarke*; leaves petioled elliptic acuminate at both ends nearly glabrous uppermost sessile cordate, spikes linear hairy interrupted, nearly all the bracts small oblong, sepals linear elongated subobtuse hairy, corolla 1½ in. purple.—Goldfussia sp. n. 29, *Herb. Ind. Or. H. f. & T.*

SUBALPINE SIKKIM; Lachoong, alt. 9000 ft., *J. D. H.*

Stems 1 foot, from a woody rootstock, slender, nearly glabrous. *Leaves* 1½ by ½ in., crenate, with minute scattered bristly hairs above and on the nerves beneath, raphides obsolete; petiole ⅙ in., one or two pairs of the leaves at the base of the spikes sessile cordate. *Spikes* 1–4 in.; flowers mostly subsolitary, occasionally opposite; bracts ¼ in., oblong or elliptic (none of the flowers with large bracts similar to the uppermost sessile cordate leaves as in *S. Wallichii*); bracteoles similar to the bracts. *Sepals* in fruit ½–¾ in., as of *S. Wallichii.*—This has been taken as a form of *S. Wallichii*; but none of the numerous forms of *S. Wallichii* have bracts and hairy spikes without foliaceous bracts like it.

134. **S. urophyllus,** *Nees in DC. Prodr.* xi. 192; leaves lanceolate acuminate at both ends glabrous, flowers scattered, lower bracts leaf-like upper small long-petioled ovate, corolla ½ in. curved pubescent without. *T. Anders. in Journ. Linn. Soc.* ix. 477. Ruellia urophylla, *Wall. Cat.* 2344. Dipteracanthus urophyllus, *Nees in Wall. Pl. As. Rar.* iii. 82.

KHASIA MTS.; *Wallich*. JAINTEA, alt. 4000 ft.; Jarain, *Clarke*.

A small, ramous, nearly glabrous shrub. *Leaves* 5½ by 1½ in., those on the flowering branches much reduced, serrate, not (or very obscurely) lineolate; nerves 9 pair; petiole 1¼ in. *Flowers* scattered, alternate and subopposite on small-leaved branches; bracts ⅕ in. exclusive of their ¼ in. petioles, nearly glabrous, persistent; bracteoles similar. *Calyx* ¼–½ in., divided nearly to the base, pubescent; segments linear, enlarged more hairy in fruit. *Capsule* ⅓–½ in., 4-seeded. *Seeds* ⅛ in., ovate, pubescent; areoles very small.

VAR. *sikkimensis*; leaves much broader, corolla 1 in. much curved purple-blue.—Darjeeling; *Griffith* (Kew Distrib. n. 6125); alt. 6000 ft., *Treutler.*—Leaves 5½ by 2¼ in. "Flowers faintly fragrant" (Treutler).

135. **S. stenophyllus,** *Clarke*; leaves narrowly lanceolate attenuate

at both ends ciliolate pubescent, flowers alternate or opposite in leafy spikes, upper bracts ovate or spathulate persistent, corolla 1 in. nearly glabrous purple.

KHASIA MTS., alt. 3–5000 ft., frequent; *J. D. H.*, &c.

A small, erect, somewhat densely branched shrub. *Leaves* 2¼ by ⅓ in., equal or subequal, minutely dentate undulate or subentire; nerves 5–6 pair, puberulous, beneath ciliate; petiole obscure. *Spikes* 1–3 in., numerous, axillary and terminal, nearly glabrous; lower bracts leaf-like; upper sometimes spathulate (hardly petioled as in *S. urophyllus*); bracteoles $\frac{1}{18}$ in., ovate. *Sepals* ⅓–½ in., subequal, linear, obtuse. *Corolla* nearly straight, hairy within; cylindric base shorter than the ventricose portion; segments short, round. *Filaments* very hairy downwards. *Ovary* glabrous; style sparsely hairy. *Capsule* ⅔ in., 4-seeded. *Seeds* ⅕–⅙ in., ovate, pubescent; areoles hardly any.—This common Khasia in habit and leaves remarkably resembles *S. isophyllus*; the inflorescence, sepals, &c., are totally different.

136. **S. Panichanga,** *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves broadly elliptic acuminate at both ends rusty-pubescent, panicles lax capillary pubescent, flowers scattered mostly alternate, bracts minute persistent, corolla 1½ in. nearly glabrous. Ruellia Panichanga, *Wall. Cat.* 2387. Asystasia Panichanga, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167.

SILHET; *Wallich.* CACHAR; *Keenan.*

A shrub; branches tetragonous, pubescent upwards. *Leaves* 6½ by 2¾ in., serrate; nerves 10 pair; petiole ¾ in. *Peduncles* ½–2 in., repeatedly trichotomous; bracts and bracteoles scarcely ⅛ in., linear, pubescent. *Calyx* ¼ in., deeply subequally 5-fid, closely uniformly pubescent; segments linear-lanceolate. *Corolla* nearly straight, puberulous, cylindric base longer than the calyx, gradually widening into the rather narrow cylindric portion of the tube; segments round, short, contorted in bud. *Filaments* and *style* with scattered white hairs. *Capsule* more than ½ in.

137. **S. coloratus,** *T. Anders. in Journ. Linn. Soc.* ix. 481, *not of Nees*; leaves ovate or elliptic acuminate glabrous, panicles capillary very compound glabrous, bracts elliptic caducous, corolla 1½ in. nearly glabrous pale purple. Ruellia colorata, *Wall. Cat.* 2388. Goldfussia colorata, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 176.—Acanthacea, *Griff. Itin. Notes*, 87, n. 1280.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2–5000 ft., *Clarke.* ASSAM and KHASIA MTS., alt. 2–4000 ft., frequent; *Griffith, H. f. & T.*, &c.

A nearly glabrous shrub, 3–6 ft. *Leaves* 7 by 2½–4 in., serrate; nerves 7–8 pair; petiole ¼–1½ in. *Panicle* often 1 foot in diam., leafless bractless with 200–500 flowers, sometimes denser with stouter shorter branches; bracts ½ in. *Calyx* ¼–⅓ in., deeply 5-fid; segments subequal, lanceolate, glabrous. *Corolla* tubular-ventricose, glabrous. *Capsule* ⅓–½ in., 4-seeded. *Seeds* ⅛–⅙ in., ovate, pubescent; areoles hardly any.—The flowers said by Nees to be capitate are mostly alternate scattered; they are capitate only at the tips of the younger panicle-branches.

VAR. *crinita*; panicle-branches minutely thinly glandular-hairy. S. crinitus, *T. Anders. in Journ. Linn. Soc.* ix. 481. Goldfussia crinita, *Nees in DC. Prodr.* xi. 176.—Bhotan, alt. 1000 ft.; *Griffith.* Assam.—Varies in the thinness of the panicle-branches just as does the type.

Series D. *Paniculatæ. Flowers* panicled laxly, or densely, secund, subspicate. *Bracts* conspicuous, persistent. *Capsule* elliptic, compressed, cuneate at both ends. *Seeds* shaggy, often only 2 perfected, or if 4 imbricated.—Species of Ceylon or S. Deccan Peninsula. (This series approaches in technical character, though not in habit, the section *** of the series A, Bracteatæ. Compare *S. perfoliatus* above, which Wight placed here.)

138. **S. sexennis,** *Nees in DC. Prodr.* xi. 187; leaves sessile elliptic attenuate at each end denticulate nearly glabrous, bracts sessile ovate base rounded or subcordate glandular-hairy or glabrate, corolla 1¼ in. glabrous. *T. Anders. in Journ. Linn. Soc.* ix. 483. S. interruptus, *Benth. in Pl. Hohenack.* n. 1432.

CEYLON; *Walker, Thwaites,* C. P. n. 2593. NILGHERRY MTS.; on Dodabetta, *Hohenacker.*

A shrub, flowering at 6 or 7 years old, then dying down. *Branches* subquadrangular, glabrous, transversely verrucose. *Leaves* 3 by 1 in.; nerves 5–6 pair; petiole winged, base dilated. *Bracts* ½ by ¼–⅓ in., glabrous or hairy on the same spike; bracteoles ½ in., oblong obtuse. *Calyx* divided subequally nearly to the base; segments linear-oblong, hairy at least at the tips. *Corolla* white (*Beddome*). *Capsule* ½ in., glabrous, 2-seeded.—Described from Nees' type specimen; the specimen in leaf only which he adds has very large many-nerved leaves very woolly when young, and is a gregarious undershrub well known to Col. Beddome in Ceylon, of which the flower has not yet been observed.

VAR. *arguta*; leaves distinctly dentate sometimes slightly hairy, petiole (even in the leaves near the spikes) usually well defined sometimes 1–2 in. not dilated at the base, spikes often elongate secund sometimes dense. S. argutus, *Nees in DC. Prodr.* xi. 188.—Ceylon, frequent; *Gardner, Thwaites,* C. P. 66 *partly,* &c.—Appears a trifling variety.

VAR. *cerinthoides*; leaves sessile elliptic or oblong narrowed suddenly at the very base subentire coriaceous few-nerved. S. cerinthoides, *Nees in DC. Prodr.* xi. 724; *T. Anders. in Thwaites Enum.* 229. Mackenziea sessilis, *Nees in DC. Prodr.* xi. 308. —Ceylon; *Thwaites* (C. P. nn. 2594, 66 partly), *Mackenzie,* &c.—The type of this with nearly all the leaves subsessile rounded at the base seems to form a distinct species, but there are examples wherein the lower leaves are cuneate at the base. The flowers are noted white with much purple marking.

VAR. *hirsutissima*; stem and leaves hirsute. S. hirsutissimus, *Nees in DC. Prodr.* xi. 187.—Ceylon; *Walker, Thwaites* (C. P. n. 3626), &c.

139. **S. homotropus,** *Nees in DC. Prodr.* xi. 187; leaves oblong or elliptic long attenuate at the base glabrous, spikes very hairy flexuose or somewhat twisted, bracts elliptic or subovate narrowed at the base, corolla 1 in. nearly glabrous. S. sexennis, *Bedd. Ic. Pl. Ind. Or.* t. 206, *not of Nees.*

NILGHERRY MTS., alt. 8000 ft.; *Wight,* &c.

This has been treated as a var. of *S. sexennis,* but the bracts are quite unlike.

140. **S. violaceus,** *Bedd. Ic. Pl. Ind. Or.* t. 205; leaves large petioled ovate hairy on both surfaces, bracts elliptic or oblong much shorter than the calyx, corolla 1½ in. glabrous without deep violet.

NILGHERRY MTS.; Sisparah, alt. 6000 ft., *Beddome.*

A large shrub, very rarely flowering (Beddome); branches quadrangular, hairy upwards. *Leaves* 6½ by 3¾ in., shortly acuminate at both ends, crenulate; nerves 14 pair; petiole 1–2 in. *Panicles* 6–10 in., lax, hairy; bracts ⅙ in.; bracteoles ⅓ in., oblong hairy. *Calyx* divided nearly to the base, less hairy than the bracteoles; segments ¼ in., narrowly oblong, obtuse. *Corolla* nearly straight, urceolate, very hairy within; constricted base short; segments short, rounded. *Capsule* not seen.

141. **S. gracilis,** *Bedd. in Trans. Linn. Soc.* xxv. 222, and *Ic. Pl. Ind. Or.* t. 207, *not of T. Anders.*; leaves sessile lanceolate attenuate at both ends glabrous, panicle glabrous, bracts oblong much shorter than the calyx, bracteoles 0, corolla 1 in. white lilac tinged. S. Beddomei, *T. Anders. in Journ. Linn. Soc.* ix. 482.

ANAMALLAY MTS., alt. 5–6000 ft.; *Beddome.*

A very large shrub (Beddome), glabrous or the sepal-tips thinly glandular-hairy; branches terete. *Leaves* 7 by $2\frac{1}{4}$ in., serrulate; nerves 10 pair. *Panicle* lax, branches long curved, flowers distant; bracts in opposite pairs, $\frac{1}{6}$–$\frac{1}{4}$ in., sometimes both, more often one only, carrying a flower on a pedicel 0–$\frac{1}{10}$ in. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., linear-ligulate. *Corolla* slightly curved, nearly glabrous, constricted part of the tube short (from Beddome). *Filaments* and *style* hairy (Beddome). *Capsule* $\frac{1}{2}$ in., glabrous.

142. **S. helicoides,** *T. Anders. in Thwaites Enum.* 229, and in *Journ. Linn. Soc.* ix. 483; leaves elliptic or obovate acuminate glabrous, panicle very compound capillary divaricate glabrous, flowers scattered mostly in appearance pedicelled, bracts much smaller than the calyx, corolla 1 in. glabrous without violet. *Bedd. Ic. Pl. Ind. Or.* t. 220. Leptacanthus helicoides, *Nees in DC. Prodr.* xi. 170.

CEYLON, up to 3000 ft. alt.; *Walker, Thwaites.*

A shrub, 2–3 ft., glabrous except the sepal-tips. *Leaves* 4 by $1\frac{1}{4}$ in. (lower larger), base cuneate rounded (or the upper cordate), toothed, paler beneath; nerves 5–6 pair; petiole 0–$\frac{1}{3}$ in. *Panicle* 6–12 in. diam., dense with slender divaricate recurved or zigzag branches; bracts at the forks $\frac{1}{8}$–$\frac{1}{2}$ in., ovate; bracts below the flowers $\frac{1}{12}$–$\frac{1}{6}$ in., linear or linear-obovate. *Sepals* $\frac{1}{4}$ in., linear, glabrous or sparsely glandular-hairy at the tips. *Corolla* nearly straight, ventricose, constricted base very short; segments short, rounded. *Capsule* $\frac{1}{3}$ in., glabrous, 2-seeded (4-seeded, *Nees*).—The flowers are in appearance solitary terminal on pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., with 2 bracts (called bracteoles by Beddome) placed 0–$\frac{1}{20}$ in. below the flower.

143. **S. rubicundus,** *T. Anders. in Journ. Linn. Soc.* ix. 483 (not of Thwaites Enum. 229); leaves lanceolate acuminate at both ends nearly glabrous, panicle compound slender glandular-pubescent, bracts at the forks ovate acuminate, flower-bracts 0, corolla $\frac{3}{4}$ in. pubescent without violet. S. paniculatus, *Bedd. Ic. Pl. Ind. Or.* t. 199, *not of T. Anders.* Ruellia rubicunda, *Heyne in Herb. Rottler*; *Wall. Cat.* 2337. Leptacanthus rubicundus, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 170.

S. DECCAN PENINSULA; Wynaad and Coorg, alt. 2–3000 ft., *Rottler, Beddome.*

A rather delicate shrub, 5–6 ft.; branches cylindric, glabrous. *Leaves* 5 by $1\frac{1}{4}$ in., undulate crenate or subentire; nerves 6–7 pair, glabrous or pubescent beneath; petiole $\frac{1}{3}$ in. *Panicle* 8 in., narrow; bracts at the forks $\frac{1}{6}$–$\frac{1}{4}$ in., lanceolate from an ovate base; pedicels $\frac{1}{6}$–$\frac{1}{2}$ in., mostly ebracteolate except at the base. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided deeply, closely pubescent; segments lanceolate-subulate, often very unequal. *Corolla* nearly straight; base funnel-shaped, hardly cylindric. *Capsule* not seen.

144. **S. paniculatus,** *T. Anders. in Journ. Linn. Soc.* ix. 483, *not of Bedd.*; leaves lanceolate acuminate at both ends nearly glabrous, panicle compound slender glandular-pubescent, bracts at the forks linear or linear-oblong, pedicels very short, flower-bracts 0, corolla nearly 1 in. glabrous without. S. rubicundus, *T. Anders. in Thwaites Enum.* 229, *not of Journ. Linn. Soc.* ix. 483.

CEYLON; *Thwaites* (C. P. n. 3351).

Pedicels 0–$\frac{1}{10}$ in. *Calyx* $\frac{1}{8}$–$\frac{1}{4}$ in., glandular-hairy. Otherwise as *S. rubicundus*; the leaves are in the examples a good deal longer.

145. **S. pulcherrimus,** *T. Anders. in Thwaites Enum.* 229, *excl. syn.*, and in *Journ. Linn. Soc.* ix. 483, *the Ceylon plant only*; leaves elliptic acuminate at both ends hairy on the nerves beneath, panicle large very compound viscous hairy, bracts at its divisions ovate acute, flower-bracts obsolete, corolla 1 in. puberulous without violet, capsule hairy. Leptacanthus Walkeri, *Nees in DC. Prodr.* xi. 170, *not of Wight.*

CEYLON, alt. 4–7000 ft.; *Walker, Thwaites* (C. P. nn. 266, 301).
A large, rambling shrub (Walker); branches terete, glabrous. *Leaves* 6½ by 2¼ in., minutely toothed; nerves 9 pair; petiole 1½ in. *Panicle* 8–14 in.; branches ascending, bracts ⅙–½ in., sessile, base rounded or cordate; pedicels ⅙–⅓ in., mostly ebracteolate except at the base. *Calyx* ⅓–½ in., divided nearly to the base, viscous-hairy; segments linear caudate. *Corolla* nearly straight; tube broad-cylindric from the base, very hairy within; segments short, round. *Capsule* ⅔ in., 4-seeded.

146. **S. amabilis,** *Clarke*; leaves broadly elliptic acuminate at both ends glabrous, panicle large compound viscous hairy, bracts at its divisions linear-oblong, flower-bracts linear much shorter than the calyx, corolla 1¼–1½ in. glabrous without purplish, capsule glabrous. Leptacanthus Walkeri, *Wight Ic.* t. 1507, *not of Nees, nor* Strobilanthes Walkeri, *Nees.*

NILGHERRY MTS., alt. 6000 ft.; *Gardner*, &c., *Hohenacker*, n. 1440.
Leaves 7½ by 3¼ in., glabrous beneath; nerves 10–12 pair. *Calyx* ⅓–⅔ in., closely subtended by 2 linear bracts. *Capsule* ¾ in. and upwards, conspicuously stipitate.—Closely allied to *S. pulcherrimus*, which it was taken for by Wight. T. Anderson overlooked the numerous points of difference above diagnosed, which are constant. A much finer species than the Ceylon one, the panicle stouter with fewer but larger flowers.

SPECIES NOT SEEN.

147. S. NEESII, *Kurz in Journ. As. Soc.* 1873, pt. ii. 93, and *For. Fl.* ii. 245; leaves large lanceolate minutely hairy on both surfaces, spikes sessile dense bracteate ultimately elongated interrupted below, bracts proper oblong-linear shorter than the calyx slightly serrate at the tips, corolla 1¼–1½ in. glabrous without purple.

MARTABAN; *Kurz.*
A large shrub, 10–12 ft. *Leaves* attaining 10 in., shortly acuminate, base attenuate, obsoletely repand-toothed; petiole ½–1½ in. Lowest *bracts* (or floral leaves) leaf-like, caducous, ½ in., tips serrate; bracteoles 2, linear-lanceolate, glandular-hirsute, as long as the calyx. *Calyx-segments* ¾ in. or more, linear, hoary, ciliate. *Corolla-tube* long, slender, hairy within. *Stamens* 2 only; filaments glabrous. *Style* hairy. *Capsule* a little longer than the calyx, glabrous, tip pubescent, 4-seeded. *Seeds* silky.

148. S. REMOTUS, *T. Anders. in Journ. Linn. Soc.* ix. 471; leaves ovate acuminate subentire glabrous, spikes axillary 1 or 2 together elongate, flowers remote solitary, bracteoles and calyx-segments smaller than the bracts, capsule elongate glabrous.

TENASSERIM; *Helfer.*
Stem subterete, glabrous. *Spikes* 1½–3 in.; bracts ⅓ in., lanceolate, mucronate, 1-nerved, glabrous; bracteoles and calyx-segments ½ in., narrower than the bracts. *Capsule* ½ in.—Allied to *S. fimbriatus* and *S. polythrix*.

149. S. HAPLANTHOIDES, *T. Anders. in Journ. Linn. Soc.* ix. 471; leaves petioled ovate acuminate at both ends crenate or undulate glabrous or floral leaves ciliate, spikes suberect lax, bracts bracteoles and calyx-segments linear hirsute with hyaline bristles, corolla funnel-shaped pubescent without hairy within.

BRITISH BURMA; Moulmein, *Falconer* (n. 402 in Herb. Calcutt.), *Helfer*, n. 255.
An erect herb, 1–1½ foot. *Stem* terete, swollen at the nodes, glabrous. *Leaves* 2–3½ by 1–1½ in., paler beneath; petiole ⅓ in. *Spikes* 2–3 in., lax, crowded in the upper axils and subterminal, on slender hirsute peduncles; bracts ½ in.; bracteoles and calyx ⅓ in. *Corolla* ½ in., tube suddenly narrowed, segments small. *Capsule* ½ in., constricted at the base, upwards ovate, acute, glabrous.—Placed by T. Anderson next *S. khasyanus*.

150. S. MASTERSI, *T. Anders. in Journ. Linn. Soc.* ix. 481; upper leaves subsessile lanceolate acute serrate subglabrous, panicles dichotomous lax erect viscous, pedicels elongate mostly 1-fld., bracts lanceolate acute sparsely glandular deciduous, corolla funnel-shaped suberect glabrous.

ASSAM; *Masters, Simons.*

Stem erect, tetragonous, glandular, viscous. *Calyx-segments* equal, linear, glandular, viscous. *Stamens* included. *Capsule* oblanceolate, elongate, tip glandular, 4-seeded.—Placed by Anderson next *S. coloratus.*

151. S. SPICATUS, *T. Anders. in Journ. Linn. Soc.* ix. 484; leaves subsessile ovate or ovate-lanceolate acute base subcordate serrate tomentose above pale pubescent beneath, spikes terminal elongate, flowers solitary sessile opposite, bracts leaf-like ovate pubescent, bracteoles small herbaceous spathulate, corolla 1½ in. funnel-shaped glabrous.

KHASIA MTS.; above Nunklow, *Simons.*

Softly pubescent; stem tetragonous. *Leaves* 1–3 by ½–1 in., floral passing into bracts. *Bracts* ⅓–⅝ in.; bracteoles ¼ in. *Calyx* ½ in.; segments linear, unequal. *Capsule* oblanceolate, glandular at the tip, 4-seeded. *Seeds* large.—Affinity uncertain, *T. Anderson.*

152. S. LAMIOIDES, *T. Anders. in Journ. Linn. Soc.* ix. 485; floral leaves large sessile ovate acuminate serrate tomentose beneath, heads terminal few-fld., bracts spathulate glandular-tomentose ciliate, corolla straight tomentose without and within. *Kurz For. Fl.* ii. 244.

PEGU; Mt. Taijoo, alt. 4000 ft., *Brandis*; Mts. Nattoung, *Cross.* MARTABAN HILLS, alt. 2–4000 ft.; *Kurz.*

An evergreen shrub (Kurz), glandular-tomentose; stem subtetragonous. Floral *leaves* 3–1 by 2–1 in., glabrous above. *Heads* leafy, lax, sessile or shortly peduncled; bracteoles linear, acute, subglabrous. *Calyx* 5-cleft to the middle; lobes linear, acute. *Corolla* ¾ in., like that of *Ruellia. Stamens* included. *Capsule* ½ in., compressed, tip bearded. *Seeds* large.—Of doubtful affinity (T. Anderson). Corolla blueish-purple, seeds shortly tomentose (Kurz).

153. S. VIOLÆFOLIUS, *T. Anders. in Journ. Linn. Soc.* ix. 485; leaves petioled obliquely ovate acute serrate subglabrous, spikes few-fld., flowers distant subsessile in opposite pairs, bracts linear, corolla funnel-shaped straight glabrous without and within.

SIKKIM HIMALAYA, alt. 5000 ft.; Ratong Valley, *T. Anderson.*

Stem herbaceous, weak; innovations pubescent. Lower *leaves* round; petiole 1 in., filiform; upper leaves sessile, 1½–3½ by 1–1½ in. *Spikes* 3–4 in., terminal on lateral branches; bracts ⅙–¼ in., linear sometimes spathulate, herbaceous; bracteoles ⅛ in., subulate. *Calyx* deeply divided; segments ½ in., linear, acute, glabrous. *Corolla* ¾ in., pale blue; lobes equal, small.—Of doubtful affinity (T. Anderson).

154. S.? LANATUS, *Nees in DC. Prodr.* xi. 191; leaves ovate acuminate entire glabrate above woolly-tomentose beneath, spikes axillary and terminal ternate cylindric dense, bracts oblong obtusely cuspidate woolly-tomentose beneath glabrous lanceolate above.

NILGHERRIES; *Perrottet.*

Very distinct from the stem, petioles under surface of leaves and spikes being densely softly tomentose. *Corolla-tube* 1 in., slender, throat campanulate, approaching that of *Stenosiphonium. Calyx* sub-5-partite; segments linear, obtuse, very villous. —Genus doubtful: referred to *Strobilanthes* from its similarity to *S. Mysurensis*, Nees, which is an *Asystasia.*

S. VERRUCULOSUS, *Nees in DC. Prodr.* xi. 181, from "India" remains obscure; Nees doubts whether it may not have been a *Ruellia.*

XIX. **CALACANTHUS,** *T. Anders.*

A shrub. *Leaves* large, entire. *Spikes* terminal, dense or elongate, hairy; bracts prominent, elliptic; flowers large, purple. *Calyx* sub-5-partite, segments unequal. *Corolla* deeply 2-lipped; posterior lip narrow, shortly 2-fid, anterior of 3 short emarginate lobes; lobes all contorted in bud. *Stamens* 4, didynamous; anthers subequal, oblong, 2-celled, muticous. *Ovary* 4-ovulate; style long, stigma simple linear. *Capsule* ellipsoid,

compressed, acute at both ends, 2-seeded. *Seeds* compressed, exareolate, densely shortly hairy.

C. Dalzelliana, *T. Anders.*; *Benth. in Gen. Pl.* ii. 1088. Lepidagathis grandiflora, *Dalz. in Hook. Kew Journ.* ii. 138; *Dalz. & Gibs. Bomb. Fl.* 190; *Bedd. Ic. Pl. Ind. Or.* t. 226.

SYHADREE MTS.; near Bombay, *Dalzell.* CANARA; near the foot of the Ghats, plentiful, *Beddome*; Purwhur Ghat, *Ritchie.*

Leaves 7 by $3\frac{1}{4}$ in., acuminate at both ends, very sparsely hairy above, glabrous beneath, minutely lineolate on both surfaces; nerves 11 pair; petiole 0–1 in. *Spikes* 1–6 in., sometimes interrupted towards the base; bracts $\frac{2}{3}$ in.; bracteoles $\frac{1}{3}$–$\frac{1}{2}$ in., oblong. *Calyx* $\frac{1}{2}$ in., hairy; one segment elliptic, two narrowly oblong, two linear-lanceolate. *Corolla* $1\frac{1}{2}$–2 in.; cylindric base shorter than the lobes; palate bullate, yellow-hairy. *Filaments* glabrous; anther-cells hairy. *Ovary* glabrous; style hairy. *Capsule* $\frac{3}{4}$ by $\frac{1}{3}$ in. *Seeds* nearly $\frac{1}{3}$ in. diam.

XX. BLEPHARIS, *Juss.*

Herbs or undershrubs, harsh often rigid or prickly. *Leaves* opposite or 4 in a whorl, subentire toothed or prickly. *Spikes* terminal or on suppressed axillary branches, strobiliform, 4-ranked or capitate and few-fld., or many-bracteate and 1-fld., bracteate and bracteolate. *Sepals* 4, unequal, in opposite pairs, inner smaller; one of the outer pair emarginate or 2-lobed. *Corolla-tube* ovoid, horny; limb of 2 lips, upper subobsolete; lower patent, 3-lobed, blue or pinkish. *Stamens* 4, didynamous; filaments thick, rigid, anterior produced above the insertion of the anthers; anthers 1-celled, margins densely bearded, second cell small or 0. *Ovary* glabrous, 4- or 2-ovulate; style linear, very shortly 2-fid. *Capsule* oblong or ellipsoid, 2- or 4-celled. *Seeds* compressed, orbicular, echinate by thick papillæ formed of closely connected tubes spirally or annularly thickened, which when moistened usually become free at their upper ends (see *Kippist in Trans. Linn. Soc.* xix. t. 6, fig. 5).—Species 20, Indian and African.

1. **B. asperrima,** *Nees in DC. Prodr.* xi. 267; leaves ovate subentire setulose, bracteoles obovate 3-toothed subglabrous green-nerved, capsule 4-seeded. *Dalz. & Gibs. Bomb. Fl.* 192; *Wight Ic.* t. 1534; *T. Anders. in Journ. Linn. Soc.* ix. 499.

W. DECCAN PENINSULA; Concan and Canara, on the Ghauts common, *Dalzell,* &c.

Stems 8–24 in., herbaceous, erect, glabrous or sparsely setulose. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., base rounded or obtuse; petiole $\frac{1}{3}$ in. *Heads* terminal and quasi-axillary, few-fld.; outermost bracts leafy; proper bracts $\frac{1}{3}$ in. or small, obovate or subpetioled, ovate; bracteoles $\frac{1}{3}$–$\frac{1}{2}$ in., usually with 3 lanceolate subspinescent teeth, the middle the shortest. *Calyx* green-and-white nerved, glabrous thinly ciliate or setulose; 2 outer segments $\frac{2}{3}$–1 in., spathulate, one bilobed; 2 inner much smaller, lanceolate. *Corolla* $\frac{3}{4}$–1 in., blue. *Capsule* $\frac{1}{2}$ in., oblong, seed-bearing from the base. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in., compressed, ovate, closely echinate; spines obtuse, lanceolate, many closely connected tubes containing spiral filaments, which rise elastically when moistened, but do not separate.

2. **B. boerhaaviæfolia,** *Pers. Syn.* ii. 180; leaves usually 4 in a whorl elliptic repand-toothed puberulous or glabrate, bracteoles spathulate bristle-ciliate subglabrous green-nerved, capsule 2-seeded. *Wall. Cat.* 2513; *Nees in Wall. Pl. As. Rar.* iii. 97, and in *DC. Prodr.* xi. 266; *Wight Ill.* t. 164 b, fig. 6, and *Ic.* t. 458; *Dalz. & Gibs. Bomb. Fl.* 192; *T. Anders. in*

Journ. Linn. Soc. ix. 500. B. maderaspatensis, *Roth Nov. Sp.* 320. Acanthus maderaspatensis, *Linn. Sp. Pl.* 892; *Roxb. Fl. Ind.* iii. 33. A. ciliaris, *Burm. Fl. Ind.* 139, t. 42, fig. 2.

DECCAN PENINSULA, from Mt. Aboo and Behar to Ceylon; common. PEGU; *Wallich*, &c.—DISTRIB. Ava, Tropical Africa.

Prostrate, scabrous or puberulous. *Leaves* 1¾ by ¾ in., acute at both ends; petiole ⅛ in. *Spikes* axillary or peduncled, 1- or few-fld.; bracts ⅓ in., ovate, bristle-ciliate; bracteoles ⅓–½ in. *Calyx* ⅓–½ in.; segments 4, oblong, unequal, nerved, subglabrous, one of the outer pair minutely emarginate. *Corolla* ⅔ in., pink, purple or nearly white. *Capsule* ¼–⅓ in., ellipsoid, compressed, shining glabrous. *Seeds* densely covered with obtuse spines formed of tubes free at the vertex when moistened.—Wight depicts the ovary 2-ovulate, and no more can be found; nor does the capsule show (as 2-seeded capsules usually do) the papillæ of the suppressed ovules; but Nees and Benth. in Gen. Pl. say the ovary is always 4-ovulate.

3. **B. molluginifolia,** *Pers. Syn.* ii. 180; leaves usually 4 in a whorl oblong hairy or minutely scabrous, heads mostly 1-fld. many of the outer bracts barren, bracteoles elliptic or oblong subsessile, capsule 2-seeded. *Wall. Cat.* 2514; *Nees in Wall. Pl. As. Rar.* iii. 97, and in *DC. Prodr.* xi. 266; *Dalz. & Gibs. Bomb. Fl.* 192; *T. Anders. in Journ. Linn. Soc.* ix. 500. B. repens, *Roth Nov. Sp.* 321. Acanthus repens, *Vahl Symb.* ii. 76. A. maderaspatensis, *Linn. Herb. partly.*

DECCAN PENINSULA; common in the Carnatic, and from Delhi and Chota Nagpore to CEYLON.

A wiry perennial; branches 3–6 in., prostrate, usually roughly hairy. *Leaves* ½–1 in., subsessile, obtuse. *Bracts* and *bracteoles* bristle-ciliate; bracts shorter than the bracteoles. *Calyx* and *corolla* nearly as of *B. boerhaaviæfolia*, but much smaller; corolla (including the larger lip) only ¼–⅓ in. *Capsule* and *seeds* as of *B. boerhaaviæfolia*, but the seeds appear (even when dry) shaggy, from the numerous bundles of annular tubes being connected only at the base.—As in *B. boerhaaviæfolia*, only 2-ovulate ovaries and 2-seeded capsules have been seen.

4. **B. sindica,** *Stocks*; *T. Anders. in Journ. Linn. Soc.* ix. 500; leaves linear or narrowly oblong pubescent, heads few- or many-fld., bracteoles linear hairy shorter than the bracts, capsule 2-seeded. Acanthodium grossum, *Wight Ic.* tt. 1535, 1536, *not of Nees.*

SCINDE; *Stocks, Dalzell.* PUNJAB; *Stewart, Vicary, Aitchison.*

Stems 3–6 in., or very short. *Leaves* 1–2 in., toothed or subspinescent. *Heads* few- or many-fld., 3–4 in. in fruit, quadrifarious; bracts 1 in. or more, ovate with divaricate lanceolate tips, prickly, hairy within and without; bracteoles ⅓ in. *Calyx* softly hairy; 2 outer segments ⅔ in., ovate; 2 inner ⅓ in. narrowly ovate. *Corolla* ½–⅔ in. *Capsule* ⅓ in., ellipsoid, compressed, shining brown. *Seeds* ¼ in.; appearing echinate, but the tufts of tubes (even in the dry state) have all their ends free.

5. **B. edulis,** *Pers. Syn.* ii. 180; leaves elliptic or oblong glaucous or pubescent, heads few- or many-fld., bracteoles linear hairy shorter than the bracts, capsule 2-seeded. *T. Anders. in Journ. Linn. Soc.* ix. 500; *Boiss. Fl. Orient.* iv. 520. Acanthus edulis, *Forsk. Fl. Æg.-Arab.* 114. A. Delillii, *Spreng. Syst.* ii. 819. Ruellia persica, *Burm. Fl. Ind.* p. 135, t. 42, fig. 1. Acanthodium spicatum, *Delile Fl. Eg.* 97, t. 33, fig. 3; *Nees in DC. Prodr.* xi. 274.

PUNJAB and SCINDE (*T. Anderson*).—DISTRIB. S.W. Asia, N.E. Africa.

Stems short or 1 foot or more, branched. *Leaves* often ½ in. broad, spinescent. *Bracts* longer and more spinous than in *B. sindica*. *Corolla* ⅔–¾ in., blue.—This differs from *B. sindica* by the broader usually glabrous-glaucous leaves, and the larger flowers: no Indian specimens have been seen. *Ruellia ciliaris*, Linn. Mant.

89, adduced as a syn. by *Nees* and *T. Anderson*, described as from India with ciliate leaves, seems more likely to have been *Blepharis boerhaaviæfolia*, i. e. Burmann's *ciliaris*.

XXI. **ACANTHUS,** *Linn.*

Erect or twining shrubs, or herbs. *Leaves* pinnatifid, toothed, spinous or rarely entire. *Spikes* terminal or pseudo-axillary, dense strobiliform or interrupted; bracts ovate, large spinescent, or small; bracteoles large, lanceolate, rarely 0; flowers subsessile, blue or white. *Sepals* 4, 2 outer opposite, 2 inner opposite smaller. *Corolla-tube* short, ovoid, horny; limb of 2 lips, upper obsolete, lower elongate obovate, shortly obtusely 3-lobed. *Stamens* 4, didynamous, shorter than the lip; filaments stout, narrowed curved below the anther, not excurrent near the apex; anthers oblong, 1-celled, bearded. *Disc* 0. *Ovary* 4-ovulate; style very shortly 2-fid; ovules 2 in each cell. *Capsule* ellipsoid, compressed, shining chestnut-brown, 4-seeded. *Seeds* compressed, orbicular, without hairs; testa very lax.—Species 14, in the warm and hot zones of the Old World.

1. **A. carduaceus,** *Griff. Itin. Notes,* 144, and *Ic. Pl. As. Or.* t. 427; leaves large sessile elliptic deeply pinnatifid glabrous lobes toothed spinescent, spikes long woolly, bracteoles 1 in. linear silky-woolly. *T. Anders. in Journ. Linn. Soc.* ix. 500.

BHOTAN; Oongar, *Griffith.*

A robust shrub, scandent on rocks (*Griffith*). *Leaves* 12–20 by 6 in., black-green or (*Griff. Priv. Journ.* 265) flesh-coloured; lobes lanceolate. *Spikes* 6–12 in., crowded towards the ends of the branches, and on long axillary peduncles, the leaves at the base of the sessile spike being only 2–4 in. long, strobiliform, obscurely 4-ranked; bracts 1¼ by ¾ in., ovate, hairy within and without, spinous; bracteoles lanceolate. *Calyx* silky, 2 outer lobes ¾–1 in., lanceolate one shortly 2-toothed; 2 inner lobes ⅝ in., lanceolate. *Corolla* 1¼ in., white (*Griffith*), altogether as in the genus. *Capsule* 1–1¼ in., ellipsoid, compressed, glabrous, shining brown, 4-seeded, much as of *A. ilicifolius.*

2. **A. leucostachyus,** *Wall. Cat.* 2512; leaves short-petioled elliptic or oblong spinous-serrate slightly hairy beneath, spikes hairy, bracteoles ¾ in. linear-lanceolate hairy. *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 270; *T. Anders. in Journ. Linn. Soc.* ix. 501.

KHASIA MTS., alt. 0–3000 ft., frequent; *Wallich,* &c. Namroop in the PATKOYE MTS., *Griffith.* CACHAR; *Keenan.*

Stem 6–15 in., decumbent, viscous-woolly. *Leaves* 8 by 3½ in., cuneate at both ends, whitened beneath; nerves beneath viscous-pubescent, prominently reticulate; petiole ⅝ in., woolly. *Spikes* 3–6 in., mostly terminal, solitary; bracts ¾–1 by ½ in., elliptic, spinous-toothed, hairy on both sides. *Calyx* softly hairy; 2 outer lobes ⅝ in., one shortly 2-toothed; 2 inner ⅓–½ in., sublinear. *Corolla* ¾ in., white (*Nees*). *Capsule* ½–⅝ in., ellipsoid, compressed, glabrous, shining-brown, 4-seeded.—The capsule and seeds greatly resemble *A. ilicifolius*, but are not ripe.

3. **A. longipetiolatus,** *Kurz For. Fl.* ii. 241; leaves long-petioled ovate subserrate pubescent on the nerves beneath, bracts obovate spinous-toothed softly hairy, corolla 1⅓ in. nearly glabrous.

PEGU; *Brandis* (Herb. Kurz).

Stem 1 foot, rather stout, decumbent, rooting, then erect, simple, rusty-pubescent. *Leaves* 6½ by 3¼ in., cuneate subacute at both ends, serratures very shallow not spinescent; petiole nearly 2 in. *Spike* solitary, simple, 5½ by 1½ in., continuous; peduncle ½ in., stout, pubescent; bracts ¾ by ½ in., teeth few, large; bracteoles 1 in., linear-subulate, hairy. *Sepals* 5, softly hairy; one 1¼ by ⅓ in. oblong obtuse, two

1 by ½ in. oblong, two ⅜ by 1/16 in. *Corolla* and *stamens* as in *A. ilicifolius*, the curving of the top of the filament insisted on by Kurz being the same as in the other species of *Acanthus*, and without the excurrent point of *Blepharis*. *Capsule* not seen.

4. **A. ilicifolius,** *Linn.*; *Benth. Fl. Austral.* iv. 548; leaves shortly petioled oblong or elliptic toothed or pinnatifid spinous rigid glabrous, spikes elongate often interrupted, bracteoles broadly lanceolate glabrous, calyx ⅜ in., corolla 1¼ in. blue. *Burm. Fl. Ind.* 138; *Blume Bijd.* 806; *Wall. Cat.* 2511; *Roxb. Fl. Ind.* iii. 32; *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 241. A. Doloarius, *Blanco Fl. Filip.* 487. Dilivaria ilicifolia, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 268; *Wight Ic.* t. 459; *Dalz. & Gibs. Bomb. Fl.* 192.—*Rheede Hort. Mal.* ii. t. 48.

Sea-coast, from MALABAR to CEYLON, and from the Soonderbund to Malacca.—DISTRIB. Malaya to the Philippines and Australia.

Stems 1–5 ft., in clumps, little divided, terete, glabrous. *Leaves* 6 by 2½ in.; petiole ¼ in., base usually spinous. *Spikes* 4–16 in., terminal, commonly solitary; flowers mostly opposite; bract ⅛–⅜ in., ovate, acute, glabrous; bracteoles ¼–⅓ in. *Sepals*, 2 outer elliptic rounded, 2 inner broadly lanceolate subacute. *Corolla* pubescent within. *Capsule* 1¼ by ⅜ in. *Seeds* ¼–⅓ in., testa white very lax.

VAR. *integrifolia*, T. Anders. in Thwaites Enum. 232; leaves lanceolate entire tip acute spinous.—Ceylon; *Thwaites.*

5. **A. ebracteatus,** *Vahl Symb.* ii. 75, t. 40; leaves shortly petioled oblong or elliptic toothed or pinnatifid spinous rigid glabrous, spikes elongate somewhat lax, bracts caducous, bracteoles obsolete, calyx ¼ in., corolla ¾ in. white. *Blume Bijd.* 806; *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 242. A. ilicifolius, *Lour. Fl. Cochinch.* 375, *not of Linn.*; *Wall. Cat.* 2511, E and *part* D. Dilivaria ebracteata, *Pers. Syn.* ii. 179; *Nees in Wall. Pl. As. Rar.* iii. 98, and *Cat.* 7169, and in *DC. Prodr.* xi. 269. —*Rumph. Amb.* vi. t. 71, fig. 1.

MALACCA; *Griffith, Maingay.* ANDAMANS; *ex Kurz.*—DISTRIB. Siam, Java, Cochin China.

Stems and leaves of *A. ilicifolius*; base of petiole spinous or not. *Bracts* ¼ in., usually caducous before the flowers expand. *Capsule* ¾ in.—Seems to differ from *A. ilicifolius* by the much smaller calyx, corolla and capsule. Vahl puts the difference too strongly when he says the flowers are only one quarter the size. Bentham (*Fl. Austral.* iv. 548) doubts the distinctness of the species. Herbarium examples of *A. ilicifolius* with the flowers in bud, which show neither the evanescence of the bracts nor the true size of the corolla, can only be distinguished by the presence of the bracteoles.

6. **A. volubilis,** *Wall. Pl. As. Rar.* ii. 56, t. 172; twining, unarmed, leaves oblong or elliptic entire glabrous, spikes linear-oblong, bracteoles 0, corolla white. *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 242. Dilivaria volubilis, *Nees in Wall. Pl. As. Rar.* iii. 98; *Griff. Notul.* iv. 138. D. scandens, *Nees in DC. Prodr.* xi. 269.

Sea-shores of the MALAY PENINSULA; Soonderbund, *Wallich, &c.*; Pegu, *Kurz*; Mergui, *Griffith.*—DISTRIB. Siam.

Stems twining in long grass, internodes often 4–8 in. *Leaves* 3½ by 1¼ in., obtuse or subacute, base attenuated; petiole ⅙ in. *Spikes* 2–3 in., hardly interrupted; flowers sub-2-seriate; bracts ⅜ in., elliptic, acute. *Calyx* ⅓–½ in., outer segments elliptic, acute, glabrous; inner similar, much shorter. *Corolla* 1 in., white, slightly tinged yellow (Wallich), probably when fading; rose (Nees).—The syn. of Rumphius (*Herb. Amb.* vi. t. 71, fig. 2, wrongly cited as t. 72 by Nees) has alternate leaves and fruits quite unlike *Acanthaceæ*.

7. **A. longibracteatus,** *Kurz in Flora* 1870, 363, and in *Journ. As. Soc.* 1870, ii. 79; leaves long-petioled ovate or elliptic-oblong acute at both ends remotely toothed pubescent, spikes terminal linear-oblong, bracts lanceolate spinous-mucronate, corolla ⅝ in.

PEGU; *Brandis* (fide Kurz).

Annual, 3–5 in.; stems terete, decumbent or ascending, densely puberulous. *Leaves* 2 in., membranous, setulose between the teeth, sparsely hairy above, nerves beneath pubescent. *Spikes* as in *A. leucostachyus*; rachis pilose; bracts ⅓ in., pubescent, lower entire, upper with 2 or 3 spinous teeth on each side; bracteoles as long as the bracts, linear. *Calyx* ½ in., adpressedly pubescent and nervose; lower segment deeply 2-fid, lobes lanceolate acuminate. *Corolla* 5-lobed, minutely hirsute in the throat.—Copied from Kurz. Notwithstanding the narrow bracts and small corolla, I suspect that this is Kurz's subsequently described *A. longipetiolatus.*

XXII. BARLERIA, *Linn.*

Undershrubs or herbs, spinescent or unarmed. *Leaves* opposite, entire. *Flowers* showy, purple blue yellow or white, sessile, solitary or in dense or sublax spikes; bracts and bracteoles large, small or 0. *Sepals* 4, in opposite pairs, outer pair very much the larger, anterior often emarginate bifid or deeply 2-lobed. *Corolla-tube* elongate, sometimes very long, funnel-shaped upwards; lobes 5, subequal, ovate, or elliptic, imbricate in bud. *Stamens* 2 with oblong 2-celled anthers; 2 small, rudimentary, or rarely with a few grains of pollen; rudimentary 5th often present. *Disc* large, often a toothed cup half enclosing the ovary. *Ovary* 4-ovulate; style long, shortly bifid or subentire. *Capsule* ovoid or oblong, 2- or 4-seeded below the middle. *Seeds* compressed, ovate, hairs wavy silky close-adpressed non-elastic (except in *B. Gibsoni*).—Species 60, tropical, mostly Old World.

Barleria lupulina, Lindl. in Bot. Reg. t. 1483, is frequently cultivated in India, and appears as an escape.

Barleria rubra, Ham., and *B. spicata*, Roxb., are entered in Steudel's Nomenclature as Indian: but it is not known from what source obtained.

Subgenus 1. **Prionitis.** Capsule ovoid, beak solid, 2-seeded close to the base.

1. **B. Prionitis,** *Linn.*; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 237; leaves elliptic acuminate at both ends spine-tipped glabrous or sometimes tawny sericeous beneath, flowers in terminal spikes yellow, bracts large elliptic spine-tipped, bracteoles very small bristles or 0. *Burm. Fl. Ind.* 135; *Blume Bijd.* 805; *Wall. Cat.* 2510; *Roxb. Fl. Ind.* iii. 36; *Dcne. in Nouv. Ann. Mus.* iii. 388; *Wight Ic.* t. 452; *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 490. B. Hystrix, *Linn. Mant.* 89; *Wall. Cat.* 7145; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. l. c.* 239. B. pubiflora, *Benth. in Flora* 1849, 558. Prionitis Hystrix & pubiflora, *Miq. Fl. Ind. Bat.* ii. 809, 810.—*Rumph. Herb. Amb.* vii. 13. *Rheede Hort. Mal.* ix. t. 41.

Tropical India; from the HIMALAYA to CEYLON and MALACCA, probably in most cases introduced.—DISTRIB. Tropical Asia and Africa.

A bush, 2–5 ft., sometimes planted for a fence; usually very prickly, rarely nearly unarmed; densely scabrid lineolate, sometimes puberulous. *Leaves* 4 by 1½ in., entire; petioles of the lower leaves usually distinct sometimes ½–1 in. *Flowers* axillary, 1–3-nate, uppermost spiked; bracts ½–1 in., entire, the lower larger, foliaceous. *Sepals* broadly lanceolate, acuminate, 2 outer ⅝–¾ in., 2 inner ½ in. *Corolla* 1¼–1¾ in., glabrous or puberulous. *Stamens* 4, 2 minute or sterile. *Disc* annular.

Pistil glabrous. *Capsule* ¾–1 in., 2-seeded. *Seeds* ⅓ in. diam., much compressed, ovate.

2. **B. cuspidata,** *Heyne*; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 239; glabrous, leaves subsessile narrowly oblong-lanceolate spine-tipped, flowers axillary scarcely spiked at the end of the branches, bracts lanceolate acuminate spine-tipped, bracteoles minute bristles or 0. *Wall. Cat.* 2499; *Wight Ic.* t. 451; *T. Anders. in Journ. Linn. Soc.* ix. 490.

S. DECCAN PENINSULA, alt. 0–2000 ft.; Concan, Carnatic, Mysore, Coimbatore, *Rottler, Wight,* &c.

A lower, harsher, more prickly undershrub than *B. Prionitis,* with shorter internodes. *Leaves* 2½ by ⅓ in., occasionally 1 by ⅓ in., elliptic, entire. *Flowers* nearly all axillary, distant; bracts ½–¾ in., usually very narrow. *Calyx* ¾–1 in., segments long acuminate. *Corolla* 1½ in., yellow. *Capsule* and *seeds* as of *B. Prionitis.*—Exceedingly near *B. Prionitis,* as Heyne has noted in Herb. Rottler. Nees erroneously says the corolla is pale blue; does not allow it to have been *B. cuspidata,* Heyne, but says it is part of *B. noctiflora,* Heyne. Heyne has, however, named these two species correctly in Rottler's Herbarium.

3. **B. Hochstetteri,** *Nees in DC. Prodr.* xi. 231; pubescent, leaves elliptic or oblong entire, flowers pedicelled, bracteoles small narrow remote from the calyx, corolla ¾–1 in. lilac. *Wight Ic.* t. 1528; *Hook. Ic. Pl.* t. 803; *T. Anders. in Journ. Linn. Soc.* ix. 494; *Boiss. Fl. Orient.* iv. 523. Barlerites Hochstetteri, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 137.

SCINDE; *Stocks.*—DISTRIB. S.W. Asia, N.E. Africa.

A woody, harsh undershrub, scarcely 1 foot high, sometimes spinescent. *Leaves* 2 by ¾–1 in., obtuse, base narrowed; petiole ⅓ in. *Pedicels* ¼–⅓ in., pubescent, often 3 on an apparent peduncle, the 2 leaves at their base much reduced, usually petioled, oblong or sublinear; bracteoles about the middle of the pedicel 2, 1, or 0, very small, linear (? bracts). *Calyx* green, pubescent; 2 outer lobes ⅓–½ in., triangular-ovate, 2 inner very small. *Stamens* 2, the 3 smaller nearly obsolete. *Disc* prominent, cup-shaped. *Ovary* hairy; stigma scarcely bifid. *Capsule* nearly ½ in., pubescent, ovoid, rostrate, 2-seeded near the base. *Seeds* densely silky.—Oersted attributes to his very bad genus *Barlerites* a unilateral linear stigma and glabrous seeds, which is wholly wrong.

Subgenus 2. **Eubarleria.** Capsule oblong or narrowly ellipsoid, 4- rarely 2-seeded at or near the middle by the suppression of the 2 lower seeds.

* *Bract* 0, *bracteoles* 2 *divaricate long-linear or spines,* 2 *outer sepals large.* [Each flower on the sympodal raceme is in the axil of one of two opposite bracteoles, and the terminal flower also is apparently 2-bracteolate; by comparing such species as *B. longiflora* & *tomentosa,* it is seen that it is the bracteoles that are really aborted in this section. The next section differs in the terminal flower having 3 (or 4) bracts in place of 2.]

† *Prickly.*

4. **B. buxifolia,** *Linn.*; *Nees in Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 241; leaves small broadly elliptic obtuse mucronate hairy, flowers solitary pedicelled or sessile, 2 outer sepals oblong entire. *Roth Nov. Sp.* 313; *Wall. Cat.* 2504, *partly*; *Roxb. Fl. Ind.* iii. 37; *Wight Ic.* t. 870; *T. Anders. in Journ. Linn. Soc.* ix. 489. Dicranacanthus buxifolia, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA, alt. 0–4000 ft.; *Rottler*; Courtallum, *Wight*; Concan, *Law,* &c.

A small, very prickly undershrub; branches hairy. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in.; petiole hardly any. *Bracteoles* $\frac{1}{4}$–$\frac{3}{4}$ in., simple spines; pedicel (above the bracteoles) $\frac{1}{8}$–$1\frac{1}{2}$ in., sometimes 0 (*B. rotundifolia*, Heyne in Herb. Rottler). *Sepals* pubescent, ciliate; 2 outer in flower $\frac{1}{3}$ by $\frac{1}{6}$ in. often lanceolate, in fruit sometimes $\frac{2}{3}$ in., oblong, obtuse, scarious, nervose, glabrate; 2 inner small. *Corolla* 1 in., purple blueish rose or white. *Capsule* $\frac{3}{4}$ in., 4-seeded.—Separable from the following by the much narrower entire outer sepals. The variation in the length of the pedicel is remarkable, but there appears to be only one species here.

5. **B. mysorensis,** *Roth Nov. Sp.* 313; leaves broadly elliptic obtuse mucronate hairy, flowers axillary sessile, 2 outer sepals large ovate subspinose denticulate softly hairy. *Heyne in Herb. Rottler.* B. buxifolia, *Wall. Cat.* 2504, *sheets* A *and* B *partly, not of Linn.* B. spina-ceylanica, *Nees in DC. Prodr.* xi. 242; *T. Anders. in Journ. Linn. Soc.* ix. 490. B. bispinosa, *Nees in Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 241, *not of Vahl.* Dicranacanthus spina-ceylanica, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA with CEYLON, alt. 0–4000 ft.; *Rottler, Wight, Thwaites,* &c.

A very prickly small shrub; branches hairy. *Leaves* $\frac{1}{2}$–1 in., hairy beneath, deciduously scabrid pubescent above; petiole hardly any. *Bracteoles* simple spines. Outer *sepals* $\frac{3}{4}$–1 by $\frac{2}{3}$ in., broadest very near the base; in fruit scarious, nerved. *Corolla* $1\frac{1}{3}$ in., purple. *Capsule* $\frac{3}{4}$ in., 4-seeded.—Nees reduced *B. mysorensis*, Heyne, to *B. noctiflora*, but both Heyne's examples and Roth's description show it to have been this.

6. **B. noctiflora,** *Linn. f. Suppl.* 290; leaves oblong or narrowly obovate mucronate pubescent afterwards glabrate, flowers axillary solitary, 2 outer sepals large ovate acute spinous-dentate sparsely pubescent, corolla-tube elongate narrowly cylindric. *Heyne in Herb. Rottler*; *Wall. Cat.* 2496; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 240, excl. syn. Roth; *T. Anders. in Journ. Linn. Soc.* ix. 490 (by typog. error B. noctifolia). B. cristata, *Lamk. Dict.* i. 380, *not of Linn.* Barleriacanthus noctiflora, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

NILGHERRY MTS., alt. 7500 ft.; Ootacamund, *Wight.* CEYLON; *Rottler.*

A small, very prickly undershrub; branches pubescent upwards. *Leaves* $\frac{3}{4}$ by $\frac{1}{6}$ in., obtuse or acute, grey pubescent at first; petiole hardly any. *Bracteoles* $\frac{1}{4}$–$\frac{3}{4}$ in., with simple spines or denticulate near the base. *Sepals* soon scarious, glabrate, nervose; 2 outer $\frac{3}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. *Corolla-tube* $1\frac{1}{4}$ by $\frac{1}{8}$ in., pubescent without; lobes $\frac{1}{3}$ in., round-ovate. *Capsule* $\frac{2}{3}$ in., 4-seeded.

7. **B. acanthoides,** *Vahl Symb.* i. 47; leaves obovate or elliptic obtuse mucronate pubescent, flowers solitary or in dense 1-sided spikes, 2 outer sepals ovate subentire pubescent, corolla-tube very long sublinear. *Nees in DC. Prodr.* xi. 240; *T. Anders. in Journ. Linn. Soc.* ix. 490 (excl. syn. *B. candida*); *Boiss. Fl. Orient.* iv. 524. Barleriacanthus acanthoides, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

SCINDE; *Stocks.* PUNJAB; Kirana Hill, *Edgeworth.*—DISTRIB. Arabia, N.E. Africa.

A small, hoary, prickly undershrub; prickles often pinnatifid near the base. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in., base attenuated; petiole 0–$\frac{1}{6}$ in. *Bracteoles* linear or linear-lanceolate, spine-tipped, rigid, often denticulate. *Sepals* soon scarious, glabrate, nervose; 2 outer $\frac{1}{2}$ by $\frac{1}{3}$ in., acute, mucronate, scarcely denticulate. *Corolla* white; tube $2\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., puberulous without; lobes $\frac{1}{3}$ in., ovate. *Capsule* $\frac{2}{3}$ in., 4-seeded.

†† *Unarmed.*

8. **B. longiflora,** *Linn. f. Suppl.* 239; pubescent, leaves petioled ovate, flowers in short dense few-fld. spikes or solitary, bracteoles very long linear laxly patent, corolla-tube very long linear pubescent without. *Vahl Symb.* i. 46, t. 16; *Gaertn. Fruct.* i. 253, t. 54; *Wall. Cat.* 2501; *Roxb. Fl. Ind.* iii. 40; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 235. B. longifolia, *T. Anders. in Journ. Linn. Soc.* ix. 491, *by typog. error not of Linn.* Barleriosiphon longiflorus, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA; *Rottler, &c.*; Tinnevelly, *Beddome.*

A shrub, 2–4 ft. *Leaves* 1¾ by 1 in., subacute, base rounded, entire; petiole ¼–½ in. *Spikes* mostly 1–4-fld.; bracteoles ½–1 by 1/10 in., softly pubescent. *Sepals* pubescent, afterwards scarious, glabrate, nervose; 2 outer ¾–1 by ½ in., ovate, entire. *Corolla-tube* 2–3 by ⅛ in.; lobes ⅓–½ in., ovate. *Capsule* ⅔ in., 4-seeded.

9. **B. tomentosa,** *Roth Nov. Sp.* 314; leaves elliptic or ovate acuminate at both ends yellow-hirsute above, bracteoles linear or linear-spathulate, sepals oblong acute young scarious coloured, corolla 2–2½ in. glabrous. *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* ix. 233; *T. Anders. in Journ. Linn. Soc.* ix. 451. B. paniculata, *Wall. Cat.* 2407; *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 233.

S. DECCAN PENINSULA; *Rottler, &c.*

A low shrub; branches hirsute. *Leaves* 2½ by 1 in., yellow-hirsute on the nerves beneath, more or less so on the surface; petiole ¼ in. *Racemes* mostly 1–3-fld.; bracteoles ½–⅔ in. *Calyx* scarious, purple-veined before the flower expands; 2 outer segments ⅔ in., broadly oblong, entire, 2 inner ⅛ in.; elongated in fruit. *Corolla* rose (Beddome); tube 2 in., linear-cylindric, upper ½ in., funnel-shaped; lobes ⅔ in., elliptic. *Capsule* ¾ in., 4-seeded, occasionally the 2 lower seeds suppressed.

VAR. *acuminata*; leaves densely pubescent subtomentose rounded or subcordate at the base, petiole 1 in. B. acuminata, *Wight Ic.* t. 450; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 234. B. tomentosa, *Wall. Cat.* 2503. B. racemosa, *Heyne in Herb. Rottler.*—S. Deccan Peninsula; Nilgherries, Anamallays, Madura, &c., *Rottler, Wight, &c.*—Easily distinguished from *B. tomentosa*, but differs only in the shape of the leaves and indumentum; the corolla is somewhat smaller.

10. **B. involucrata,** *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 232; leaves elliptic narrow at both ends yellow-strigose on the nerves beneath, racemes few-fld. axillary, bracteoles lanceolate or linear much shorter than the sepals, sepals 1 in. elongate elliptic, corolla 2 in. blue. *Wight Ill.* t. 164; *T. Anders. in Journ. Linn. Soc.* ix. 492. B. pentandra, *Arn.*; *Nees in DC. Prodr.* xi. 232; *T. Anders. in Thwaites Enum.* 230, *partly.* B. Macraei, *Arn. ms.*

CEYLON, in the hills; *Macrae, Gardner, &c.* MALABAR (var. *elata*).

Herbaceous, strigose. *Leaves* 4½ by 1¾ in., sparsely yellow strigillose above; petiole ½ in. *Racemes* yellow-strigose; bracteoles ½ by ⅓ in. (in Nees' type), ⅓ by 1/20 in. (in Arnott's *B. pentandra*). *Sepals* subacute. *Corolla-tube* 1¼ in.; lobes 1¼ in., obovate-elliptic. *Capsule* nearly 1 in., 4-seeded.—Nees has confounded the Ceylon and Nilgiri varieties of this species; his description of *B. involucrata* is founded on Wight's n. 1958 from Ceylon, and he says the bracteoles are 4 lines long; he then places under this the Malabar specimens, which do not suit the description, and which all belong to his *B. terminalis* (see *B. strigosa*, var.). The Ceylon specimens are very uniform, drying black, and having the racemes mainly axillary. The bracteoles are in well-developed specimens much longer than in the poor pieces Nees and Arnott had, but still much shorter than in *B. elata.* Wight's n. 1958 has the bracteoles unusually broad and obtuse.

VAR. *elata*; leaves larger lower often a foot long, racemes stout helicoid often collected towards the ends of the branches, bracteoles often 1–1½ in., linear-lanceolate, corolla 3–3½ in. B. elata, *Dalz. in Hook. Kew Journ.* iii. 227; *Dalz. & Gibs. Bomb. Fl.* 189. B. cœrulea, *Wall. Cat.* 2509, *sheet* β, *partly.*—Malabar, alt. 2–5000 ft., from the Bombay Ghauts to the Pulneys and Anamallays, frequent; *Gardner*, &c.—Shrubby, 6 ft. high (Dalzell). In Wight's Nilgherry examples, the corolla-tube is 1¾ in., the upper ¾ whereof is considerably inflated; the lobes are 1¾ by ¾ in., obovate, obtuse; the racemes form dense sub-leafless short terminal panicles.

11. **B. vestita,** *T. Anders. in Thwaites Enum.* 230, and in *Journ. Linn. Soc.* ix. 492; leaves elliptic or somewhat obovate acuminate at both ends fulvous-shaggy on both surfaces, racemes lax, bracteoles linear-lanceolate, outer sepals elliptic elongate-acuminate, corolla 3 in. *Bedd. Ic. Pl. Ind. Or.* t. 263. B. pentandra, Var. β, *Nees in DC. Prodr.* xi. 233.

CEYLON, alt. 5000 ft.; *Walker, Thwaites.*

Herbaceous; stems stout, hirsute. *Leaves* 7 by 3 in.; nerves 12–15 pair, conspicuous; petiole ¼–⅓ in. *Racemes* on peduncles 3 in., i.e. the leaves at their base ¾ in., linear-lanceolate, scarcely larger than the other bracts; lower flowers 1 in. or more apart. *Calyx* and *corolla* exactly as of *B. involucrata*, of which Nees considered it a var.

** *Bracteoles* 2, *opposite, close to the calyx or above the bract at the base of the pedicel, narrow, much smaller than the* 2 *outer sepals.*

12. **B. pilosa,** *Wall. Cat.* 2502; softly hairy, leaves ovate acuminate, flowers axillary solitary, outer sepals ovate or orbicular scarious dentate, corolla 1½ in. blue. *Heyne in Herb. Rottler*; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 234; *T. Anders. in Journ. Linn. Soc.* ix. 491; *Bedd. Ic. Pl. Ind. Or.* t. 256.

S. DECCAN PENINSULA, alt. 1000–1500 ft.; Courtallum, *Rottler, Wight*; Coimbatore, *Beddome.*

A small, ramous shrub. *Leaves* 4 by 2 in., often much smaller on the lateral flower-bearing branchlets, sometimes obscurely denticulate; petiole 2 in. *Pedicels* ⅛ in.; bracteoles ¼–⅓ in., linear, subdenticulate, hairy, above the base of the pedicel. *Sepals* hairy, ultimately glabrate, nervose; 2 outer ⅓–½ in. diam., subspinosely toothed. *Corolla* glabrous; tube nearly 1 in.; lobes ⅓–½ in., broadly elliptic. *Capsule* ½ in., 4-seeded; seeds shaggy, the hair finally rubbing off except near the hilum.

13. **B. Lawii,** *T. Anders. in Journ. Linn. Soc.* ix. 492; leaves elliptic acuminate at both ends lineolate above fulvous-strigose on the nerves beneath, racemes short capitate, bracts and bracteoles small linear, outer sepals 1 in. elliptic acute entire, corolla 3–3½ in. minutely pilose without. B. Beddomei, *Bedd. Ic. Pl. Ind. Or.* t. 258.—Barleria sp. n. 33, *Herb. Ind. Or. H.f. & T.*

W. DECCAN PENINSULA, in the Ghauts; Bababoodun Hills, *Law* (T. Anderson).

An erect shrub; branches strigose upwards. *Leaves* 6 by 2¼ in.; petiole ¼–⅓ in. *Racemes* fulvous-strigose; bracts ⅛ in., linear-spathulate; bracteoles nearly as long, linear, acute. *Sepals* nervose, strigose without; 2 outer ¼–⅓ in. broad, one of these shortly 2-toothed. *Corolla* white (Dalzell), beautifully veined when dry, noted blue in Wight's Herbarium; tube elongate funnel-shaped, lobes 1 in., obovate. *Capsule* nearly 1 in., oblong or slightly obovate, 4-seeded; fruiting-sepals somewhat enlarged.

14. **B. Arnottiana,** *Nees in DC. Prodr.* xi. 232; leaves elliptic acuminate at both ends hairy, pedicels axillary solitary, bracteoles lanceolate,

outer sepals large ovate subobtuse, corolla 2¾ in. *T. Anders. in Journ. Linn. Soc.* ix. 492.

CEYLON, alt. 6000 ft.; *Gardner, Thwaites,* &c.

Herbaceous; stems fulvous-strigose. *Leaves* 4 by 1½ in., with scattered yellow hairs above, obscurely lineolate, beneath yellow-strigose especially on the nerves; petiole ¼–1 in. *Bracteoles* ¼–¾ in., lanceolate or elliptic spathulate or 0. Outer *sepals* 1¼ by ½ in., yellow-strigose, obtuse, one shortly bifid. *Corolla* blue; tube 1½ in., lobes 1 in., obovate, subemarginate. *Capsule* 1 in., broadly oblong, 4-seeded; sepals enlarged, scarious, nerved in fruit.

VAR. *pentandra*; leaves thinner glabrescent conspicuously lineolate above, bracteoles ⅓ in., linear-setaceous, outer sepals elliptic elongate acute nearly glabrous. B. pentandra, *Arn.*; *T. Anders. in Thwaites Enum.* 230 *partly, excl. syn.*—Ceylon, *Thwaites* (C. P. n. 2558).

VAR. *Beddomei*; leaves elliptic acute at both ends bristly pubescent on both surfaces, flowers solitary axillary, sepals large ovate acute nervose bristly-pubescent.—Tenasserim; Mooleyit slopes, *Beddome.*—Herbaceous; stems fulvous-pubescent or substrigose. *Leaves* 3–4 by 1½ in., not acuminate, petiole ⅓ in. *Pedicel* ⅛ in.; bracteoles ¼–⅓ in., linear, rigid, bristly-pubescent. Outer *sepals* nearly 1 by ½ in., one of them very shortly bifid at the tip. *Corolla* 2¾ in., beautifully veined when dry, altogether as of *B. Arnottiana. Capsule* ¾ in., narrowly ellipsoid, rigid. *Seeds* more than ¼ in. diam., obovate-truncate, compressed, rugose-silky.—Possibly a new species; close to *B. Arnottiana.*

15. **B. sepalosa,** *Clarke*; hairy, leaves elliptic acute, racemes axillary 1–3 fld., bracteoles narrowly lanceolate, outer sepals very large broadly elliptic acute.—Barleria sp. n. 35, *Herb. Ind. Or. H.f. & T.*

CONCAN; *Gibson.*

Shrubby; stems upward villous, subtomentose. Upper *leaves* 3½ by 1¼ in., base shortly narrowed, covered with short yellow hairs on both surfaces, somewhat rigid, strongly reticulated beneath; petiole ⅕ in. *Bracteoles* ¾ by ⅙ in., rigid, acute. Outer *sepals* 1¾ by ¾ in., one bifid, base rounded, yellow-villous, subtomentose, in fruit nervose, subscarious. *Capsule* ¾–1 in. *Corolla* not seen.

16. **B. montana,** *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 232; nearly glabrous, leaves narrowly ovate acuminate at both ends, flowers axillary solitary and running into terminal spikes, outer sepals large ovate, corolla 2 in., seeds densely silky. *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 493; *Bedd. Ic. Pl. Ind. Or.* t. 257. B. purpurea, *Lodd. Bot. Cab.* t. 344. Ruellia? montana, *Wall. Cat.* 2391. —Barleria sp. n. 32, *Herb. Ind. Or. H.f. & T.*

W. DECCAN PENINSULA, in the Ghauts frequent; from Jubbulpore to Travancore.

Herbaceous, erect, 2 ft. high. *Leaves* 5 by 2 in., often glaucous, margins sometimes minutely scabrous; petiole ¼–1 in. *Bracteoles* linear, ¼ in. or in large examples 1 in. Outer *sepals* 1½ by ¾ in. in large examples, often hardly half so large, rounded or very acute, entire, glabrous or minutely scabrous. *Corolla* blue (Beddome), rose (Dalzell); lobes ⅔ in. diam., orbicular. *Capsule* 1 in., 4-seeded. *Seeds* ¼ in. diam. or more, close covered with wavy silky yellowish hair, as in many other species.

17. **B. Gibsoni,** *Dalz. in Hook. Kew Journ.* ii. 339; nearly glabrous, leaves ovate acute, flowers axillary solitary and running into terminal spikes, outer sepals large ovate, corolla 2–2½ in., seeds glabrous. *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 493. B. montana, *Wight & Nees partly*; *Herb. Ind. Or. H.f. & T.* n. 34.

W. DECCAN PENINSULA; Concan, *Stocks*; Ellora Hill, *Ralph*; Belgaum, *Ritchie*; Bombay Ghauts and Brahminwara Range, *Dalzell*; N. Canara, *Brandis.*

So exceedingly like *B. montana*, except as to the seeds, that it has been mixed

therewith from Wight's day. Lower *leaves* often very large and very glaucous. Terminal *spike* more closely imbricated than in *B. montana*; flowers rather larger, corolla-lobes often 1 in. *Capsule* ¾ in., 4-seeded. *Seeds* ⅕ in. diam., when ripe nearly black; always glabrous, and so differing from all other Barlerias.

18. **B. grandiflora,** *Dalz. in Hook. Kew Journ.* ii. 339; nearly glabrous, leaves elliptic narrowed at both ends, flowers solitary axillary, outer sepals very large broadly elliptic acute, corolla 4 in. white. *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 493.

CONCAN; *Stocks*; Mangellee Ghaut, *Dalzell.*

Herbaceous; innovations shortly minutely pubescent. *Leaves* 5 by 2 in., often glaucous; petiole ⅙ in., pubescent. *Bracteoles* ⅓–⅔ in., linear-ligulate. Outer *sepals* 2 by 1 in., entire, herbaceous, pubescent within. *Corolla* minutely pubescent without; lobes 1¼ in. *Capsule* not seen.—Closely allied to *B. Gibsoni.*

19. **B. cristata,** *Linn.*; *Benth. Fl. Hongk.* 262; leaves oblong or elliptic acute yellow-hairy beneath, spikes capitate, outer sepals ovate-acuminate or lanceolate toothed nervose, corolla 1½ in. purple-blue or white. *Burm. Fl. Ind.* 136; *Roxb. Fl. Ind.* iii. 37; *Wall. Cat.* 2506; *Don Prodr.* 119; *Roth Nov. Sp.* 315; *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 229; *Bot. Mag.* t. 1615; *Wight Ic.* t. 453; *Dalz. & Gibs. Bomb. Fl.* 188; *T. Anders. in Thwaites Enum.* 230, and in *Journ. Linn. Soc.* ix. 490 B. dichotoma, *Roxb. Fl. Ind.* iii. 39; *Wall. Cat.* 2508; *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. l. c.* 227; *Dalz. & Gibs. l. c.* 188. B. ciliata, *Roxb. l. c.* 38; *Wall. Cat.* 2507; *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. l. c.* 228. B. napalensis & nuda, *Nees in Wall. Pl. As. Rar.* iii. 91, 92, and in *DC. l. c.* 228, 229. B. laciniata, *Wall. Cat.* 7144, and *Nees ll. c.*

SUBTROPICAL INDIA; N.W. Himalaya, Sikkim, Khasia, Burma, Central India, Nilgherries, common.—DISTRIB. Gardens of India, Malaya, China, &c.

An erect or diffuse undershrub; branches adpressedly yellow-hairy. *Leaves* 3–4 by 1 in., or, where burnt up, 1 by ⅓ in., yellow-hairy or lineolate above; petiole ⅛–⅓ in. *Spikes* ovate, often compound, dense; bracteoles ⅓–⅔ in., linear-lanceolate, toothed. Outer *sepals* ¾ in., toothed, softly hairy, glabrous, subspinescent. *Corolla-tube* funnel-shaped in the upper half; lobes ½ in., ovate. *Capsule* ⅔ in., 4-seeded. *Seeds* orbicular, compressed, silky.—Uniform except as to habit and indumentum. The common Sikkim form has erect stems, leaves 4 in. long, glabrate lineolate above, outer sepals subspinous-ciliate; a common Khasia form is similar, but has the sepals very sparingly toothed; the West Himalaya form (*B. napalensis* var. *microphylla*, Nees) has leaves hardly an inch long and many solitary flowers; *B. salicifolia*, Heyne, has a diffuse weedy habit, linear-oblong leaves and much yellow hair; the South Indian plant, on hotter drier rocks, has often smaller more rigid very hairy leaves, and very hairy sepals. There can be, as T. Anderson states, no doubt that this plant is wild everywhere in the lower hills of N.E. and Central India; and no doubt in the Mts. of S. India also.

20. **B. nutans,** *Nees in DC. Prodr.* xi. 227; leaves narrowly obovate attenuately acuminate at both ends glabrous, spikes elongate pubescent, bracts and bracteoles small lanceolate, sepals lanceolate minutely pubescent, corolla 1 in. blueish purple. *T. Anders. in Thwaites Enum.* 230, and in *Journ. Linn. Soc.* ix. 493; *Bedd. Ic. Pl. Ind. Or.* t. 264.

CEYLON, alt. 1–3000 ft.; *Gardner, Champion*, &c.

An undershrub. *Leaves* 8 by 1¾ in., lineolate above; petiole ¼–1¼ in. *Spikes* 1–5 in., often nodding, dense with flowers; bracts and bracteoles ⅛–¼ in. Outer *sepals* nearly ½ in., nervose, one divided ⅓ the way down into 2 narrow-lanceolate teeth. *Corolla* nearly glabrous, deep blue-purple; tube funnel-shaped upwards; lobes ⅓ in., ovate. *Capsule* ¾–1 in., 4-seeded. *Seeds* ¼ in. diam., silky.

21. **B. courtallica,** *Nees in DC. Prodr.* xi. 226; leaves narrowly obovate or elliptic attenuately acuminate at both ends glabrous, spikes elongate pubescent, bracts and bracteoles small linear-lanceolate, sepals elliptic acuminate very pubescent, corolla 1½–2 in. *Dalz. & Gibs. Bomb. Fl.* 188; *Wight Ic.* t. 1529; *T. Anders. in Journ. Linn. Soc.* ix. 493. B. inæqualis, *Benth. in Flora* 1849, 577.

W. DECCAN PENINSULA; from the Concan to Courtallum, *Wight*, &c.

A large shrub (Wight). *Spikes* 1–3 in., dense; bracts ¼ in.; bracteoles ⅙–⅓ in. Outer *sepals* ⅝ by ¼ in., nervose, subcorolloid, much more pubescent than in *B. nutans*. *Corolla* blue and yellow (Dalzell), white (Ritchie). *Capsule* and *seeds* as in *B. nutans*.—Closely allied to *B. nutans*, differing in the broader sepals and larger flowers.

*** *Bracteoles* 2, *lanceolate or elliptic, often nearly as long as the calyx.*

22. **B. conspicua,** *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 226; leaves elongate-oblong acuminate at both ends, spikes linear-oblong somewhat yellow-strigose, bracteoles linear-oblong as long as the calyx, corolla 1 in. *T. Anders. in Journ. Linn. Soc.* ix. 493. Justicia conspicua, *Wall. Cat.* 2460.

PENANG; *Wallich.*

Leaves 8 by 2 in., lineolate above, somewhat yellow-strigose on the nerves beneath; petiole ⅜ in. *Spikes* 4 in., terminal, erect, somewhat lax; bracts ⅝ by ⅛ in., spathulate-oblong; bracteoles ⅝ by ⅛ in. Outer *sepals* ⅝ in., lanceolate, acute, yellow-hairy, one bifid at the apex. *Capsule* ⅝ in., narrowly ellipsoid, acute at both ends, glabrate, 4-seeded. *Seeds* ultimately nearly glabrous except near the base.

23. **B. Stocksii,** *T. Anders. in Journ. Linn. Soc.* ix. 493; leaves subsessile elliptic acute shining nearly glabrous, flowers solitary axillary, bracteoles narrowly oblong hispid-ciliate as long as the calyx, capsule 2-seeded.

BOMBAY; Bababoodun Hills, *Stocks.*

A small undershrub; branches erect, sparsely hispid. *Leaves* 2¼ by 1 in., base rounded, glabrous or slightly hispid-ciliate; petiole 0–⅛ in. *Bracteoles* 1 by ⅛ in., subobtuse. *Sepals* 1 in., subentire, hispid-ciliate, 2 outer lanceolate, one bifid ⅓ the way down into narrow lanceolate segments. *Corolla* not seen. *Capsule* ¾ in., shortly obovoid compressed rostrate. *Seeds* nearly ⅓ in. diam., silky, occupying the middle of the capsule.—T. Anderson, from the habit and leaves of this plant, evidently considered it allied to *B. montana*. The capsule is narrowed towards the base, or it might be arranged in the section *Prionitis*. It is really a very marked species, almost worthy a sectioa to itself.

24. **B. strigosa,** *Willd. Sp. Pl.* iii. 379; leaves large ovate acute long-decurrent on the petiole glabrate above, spikes dense many-fld. 1-sided, bracteoles oblong or elliptic shorter than the calyx, outer sepals ovate ciliate-denticulate minutely strigose, corolla 1½–2 in. blue. *Heyne in Herb. Rottler.* B. cærulea, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 39; *Wall. Cat.* 2509; *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. Prodr.* xi. 226; *T. Anders. in Journ. Linn. Soc.* ix. 491. B. macrophylla, *Heyne in Herb. Rottler.* Pseudobarleria cærulea, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 135.

BENGAL, in the lower hills, alt. 0–4000 ft., common; ORISSA, CHOTA NAGPORE, SIKKIM, ASSAM.—DISTRIB. Much cultivated in India and Malaya.

Shrubby, 2-4 ft.; branches fulvous-strigose upwards. *Leaves* 5¼ by 2¼ in. (sometimes twice as large), widest towards the base, lineolate above, fulvous-strigose on the nerves beneath; petiole ¼–1 in., or 0, i. e. subalate by the much decurrent leaf-base.

Spikes 1–3 in., very dense, often glomerate, always secund, the sepals densely imbricated, the bracteoles appearing patent or reflexed on one side; bracteoles $\frac{1}{3}$–$\frac{2}{3}$ in., lanceolate or subovate. Outer *sepals* 1 in., sometimes more, nervose. *Corolla* funnel-shaped in the upper half of the tube; lobes $\frac{2}{3}$ in., ovate. *Capsule* $\frac{3}{4}$ in., 4-seeded; seeds silky.

VAR. *polystachya*; leaves very large fulvous-hirsute above somewhat glaucescent beneath, spikes densely agglomerated yellow-hirsute. B. polystachya, *Nees in DC. Prodr.* xi. 226.—Concan; *Stocks.*

VAR. *terminalis*; leaves thinly fulvous-hirsute above, spikes substrobilate not or very obscurely 1-sided, outer sepals more softly hairy often obtuse. B. terminalis, *Nees in DC. Prodr.* xi. 225; *Dalz & Gibs. Bomb. Fl.* 188.—Concan; *Jacquemont*, &c. Belgaum; *Ritchie.*—This may be a distinct species, as Dalzell considers; but T. Anderson does not deem it worth notice as a var.

25. **B. polytricha,** *Wall. Pl. As. Rar.* i. 72, t. 82, and *Cat.* 7143; leaves large oblong attenuate at both ends hirsute above, spikes dense many-fld. 1-sided, bracteoles oblong or elliptic somewhat shorter than the calyx, outer sepals ovate ciliate-denticulate hirsute, corolla $1\frac{1}{2}$–2 in. blue. *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. Prodr.* xi. 225; *T. Anders. in Journ. Linn. Soc.* ix. 491. B. cærulea, *Wall. Cat.* 2509, *letter* K *only.* B. hirsuta, *Wall. Cat.* 7142; *Nees ll. c.* Pseudobarleria polytricha, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 135.

CHITTAGONG, PEGU and TENASSERIM; *Wallich*, &c., frequent.—DISTRIB. Ava.

Leaves 6 by $1\frac{3}{4}$ in., base gradually cuneately attenuated, hairs long on the upper surface; otherwise altogether as *B. strigosa.*

VAR. *polystachya* has the leaves suddenly narrowed to the subalate petiole. *B. hirsuta* is a young state, having the heads substrobiliform, not (or very obscurely) 1-sided; probably always more or less 1-sided in fruit.

26. **B. nitida,** *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. Prodr.* xi. 224; leaves ovate or elliptic shortly acuminate at both ends lineolate nearly glabrous above, spikes dense 1-sided, bracteoles elliptic or subovate nearly as long as the calyx, outer sepals ovate strongly ciliate-denticulate shining sparsely hispidulous not strigose, corolla $1\frac{1}{2}$ in. blue. *Wight Ic.* t. 454; *T. Anders. in Journ. Linn. Soc.* ix. 491. B. cærulea, *Wall. Cat.* 2509, *letter* H *only.* B. bracteata, *Heyne in Herb. Rottler.*

Hills of S. DECCAN PENINSULA; *Rottler*; Courtallum, *Wight*; Nilghiries. *Foulkes*; Tinnevelly Hills, *Beddome.*

Leaves $1\frac{1}{2}$–2 in. Outer *sepals* shining, with scattered yellow hairs, but no strigose pubescence on the nerves without; otherwise as *B. strigosa*, from which T. Anderson admits it to be specifically distinct. The Simla plant referred to this species by Nees is *B. strigosa*, with (as usual in the N.W. Himalaya) smaller leaves than in the Sikkim Terai form.

XXIII. NEURACANTHUS, *Nees.*

Perennials; flowering stems erect, annual. *Leaves* entire. *Flowers* small, blue, spicate; spikes axillary or terminal, elongate strobilate or dense capitate; bracts ovate, membranous or coriaceous; bracteoles 0 or minute. *Calyx* 2-partite; posterior segment 3-toothed, anterior 2-toothed or 2-partite. *Corolla* tubular, upper half wide-funnel-shaped; limb subentire or obscurely lobed, plicate. *Stamens* 4, didynamous; anterior anthers 2-lobed, posterior 1-lobed (second lobe rudimentary); lobes ovoid, distinct, sometimes hairy. *Style* at the apex 2-branched, 1 branch linear-lanceolate, the other obsolete; ovary 4-ovulate. *Capsule* oblong, glabrous, 4-seeded. *Seeds* much compressed, ovate, densely inelastically silky.—Species 6, the 5 following and a tropical African one.

Lepidagathis differs by the anthers all 2-celled, the stigma subequally minutely 2-lobed, and the presence of bracteoles. N. subuninervius, Kurz, has been removed to *Lepidagathis*.

* *Spikes axillary, elongate, bracts sub-4-ranked.*

1. **N. trinervius,** *Wight Ic.* t. 1532; leaves sessile elliptic cuneate at both ends nearly glabrous, bracts ovate or obovate spinous-mucronate 5-nerved, calyx-segments linear-lanceolate long-ciliate. *Dalz. & Gibs. Bomb. Fl.* 190; *T. Anders. in Journ. Linn. Soc.* ix. 494.

CONCAN; in the Ghauts, *Law, Dalzell,* &c.; Salsette, *Herb. Wight.*

Stems 1–3 ft., glabrous except at the tips. *Leaves* 4½ by 1¾ in., lineolate above, sometimes minutely setose. *Spikes* 1–5 in., hairy; bracts ⅓ by ⅙ in. *Calyx* ¼ in.; segments divided about half-way down; cilia ⅛ in., rising from minute glistening tubercles. *Corolla* ⅓ in., blue, nearly glabrous without, 2-lipped; segments 5, subsimilar, obtusely triangular, plicate in bud, tips tufted. *Capsule* ¼ in. *Seeds* $\frac{1}{16}$ in.

2. **N. tetragonostachyus,** *Nees in Wall. Pl. As. Rar.* iii. 97, and *Cat.* 7168, and in *DC. Prodr.* xi. 248; leaves short-petioled elliptic or obovate-lanceolate attenuate at both ends thinly pubescent or glabrous, bracts elliptic spinous-mucronate 5-nerved, calyx-segments linear-lanceolate long-ciliate. *T. Anders. in Journ. Linn. Soc.* ix. 494.

PEGU; Prome Hills, *Wallich*; Rangoon, *M'Lelland*; Moulmein, *Parish.*

Hardly differs from *N. trinervius* except in the greater attenuation of the leaves at both ends. *Flowers* blue (*Parish*).

3. **N. grandiflorus,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 95; leaves small obovate or oblong subobtuse nearly glabrous, bracts ovate-lanceolate rigid 5-nerved, calyx-segments lanceolate long-ciliate.

PEGU; Prome, *Kurz.*

Leaves 1½ by ¾ in., not lineolate, minute scabrid-pubescent (in Kurz's specimen); petiole obsolete. *Corolla* ½ in., or rather more, blue.—Exceedingly near *N. tetragonostachyus*, but has much smaller leaves, and larger flowers. *Neuracanthus* sp. (Kew Distrib. n. 6144), collected by Griffith in Hookhoom Valley, Upper Burma, is perhaps a variety, but has the leaves closely pubescent beneath.

** *Spikes axillary, densely capitate, bracts not 4-ranked.*

4. **N. sphærostachyus,** *Dalz. in Hook. Kew Journ.* ii. 140; leaves subsessile elliptic nearly glabrous, bracts ovate softly white-hairy, calyx-segments lanceolate or subovate subobtuse. *Dalz. & Gibs. Bomb. Fl.* 190; *Hook. Ic. Pl.* t. 835. N. Lawii, *Wight Ic.* t. 1531; *T. Anders. in Journ. Linn. Soc.* ix. 494. Lepidagathis sphærostachya, *Nees in DC. Prodr.* xi. 254.

CONCAN; *Dalzell,* &c.; common in Bombay Island.

Stems 1–2 ft. *Leaves* 4½ by 2 in., obtuse or subacute, lineolate above; petiole scarcely ⅛ in. *Spikes* 1–2 in., sometimes agglomerated into axillary globes 3–4 in. diam.; bracts ½ in., purplish. *Calyx* ⅓ in., one lobe shortly 3-toothed, the other deeply 2-fid. *Corolla* ¾ in.; limb a fine blue, obconic, subentire, plicate; lower lip of 3 very depressed triangular lobes, upper an emarginate subsimilar lobe. *Anthers* pubescent. *Capsule* ⅓ in., 4-seeded. *Seeds* ⅛ in. diam.—The plant appears rarely to seed, as Dalzell notes.

*** *Spikes terminal, oblong.*

5. **N. Neesianus,** *Clarke*; hoary silky subtomentose, leaves sessile

ovate or broadly elliptic base cuneate. Lepidagathis Neesianus, *Wight*; *T. Anders. in Journ. Linn. Soc.* ix. 499.

MADRAS; Paloor (in Arcot) on black cotton-soil, *Wight.*

Stems 12–18 in., procumbent, terete, softly hairy. *Leaves* 2 by 1 in., obtuse, entire, silky on both surfaces, young white-tomentose beneath. *Spikes* 2 by $\frac{2}{3}$ in., dense; bracts $\frac{1}{4}$ in., ovate, acute, obscurely 4-ranked; bracteoles small, subulate. *Calyx* 2-partite; one segment 3-lobed less than half-way down, lobes lanceolate acute; the other 2-lobed nearly to the base. *Corolla* 2-lipped; upper lip ovate minutely bifid, lower 3-partite, lobes ovate mucronate. *Stamens* 4, included; the upper anthers 2 with 2 divaricate cells, lower 1-celled; connective hairy. *Capsule* $\frac{1}{3}$ in., oblong, 4-seeded. *Seeds* compressed, hairy.—Flowers or stamens described by T. Anderson, whose account of the stamens requires the species to be transferred from *Lepidagathis* to *Neuracanthus,* as does also the structure of the calyx, which is erroneously given by T. Anderson. Wight has written on his original ticket "Paloor, in black cotton soil," which T. Anderson has taken to be Palamcottah (near Tinnevelly), where it is believed there is no black cotton-soil.

XXIV. **CROSSANDRA,** *Salisb.*

Undershrubs. *Leaves* entire or undulate, subdentate. *Spikes* linear-oblong; bracts imbricate; bracteoles linear; flowers sessile, yellow. *Sepals* 5, ovate, acute, 2 inner much smaller. *Corolla-tube* linear, incurved; limb on one side of 5 subequal, elliptic lobes, imbricate in the bud. *Stamens* 4, didynamous; anthers 1-celled, muticous; connective mucronate. *Style* minutely 2-lobed at the tip; ovary 4-ovulate. *Capsule* oblong, acute, 4-seeded. *Seeds* compressed, orbicular, adpressedly scaly; scales of numerous hairs coalescing nearly to their tips, which are seen imperfectly free when moistened.—Species 5; 1 in India, 4 in Tropical Africa or Madagascar.

C. undulæfolia, *Salisb. Par. Lond.* t. 12; leaves ovate or lanceolate narrowed at both ends, spikes sessile or peduncled pubescent. *Bot. Reg.* t. 69; *Bot. Mag.* t. 2186. C. axillaris, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 281; *Wight Ill.* t. 164 b, fig. 7, and *Ic.* t. 460; *Dalz. & Gibs. Bomb. Fl.* 193. C. infundibuliformis, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. l. c.* 280; *Wight Ic.* t. 461; *T. Anders. in Journ. Linn. Soc.* ix. 494. C. oppositifolia, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. l. c.* 281. C. coccinea, *Dalz. & Gibs. Bomb. Fl. Suppl.* 71. Justicia infundibuliformis, *Linn.*; *Burm. Fl. Ind.* 7. Harrachia speciosa, *Jacq. Ecl.* 33, t. 21; *Blume Bijd.* 793. Ruellia infundibuliformis, *Roxb. Fl. Ind.* iii. 41; *Wall. Cat.* 2364.—*Rheede Hort. Mal.* ix. t. 62.

DECCAN PENINSULA and CEYLON.—DISTRIB. Cult. in N. India, the Malay Peninsula and Islands.

Stems 1–3 ft., pubescent upwards. *Leaves* 4 by $1\frac{1}{2}$ in. (often much smaller), glabrous or pubescent beneath; petiole $\frac{1}{4}$–1 in. *Peduncles* 0–5 in.; spikes 1–4 in.; bracts $\frac{1}{2}$ by $\frac{1}{3}$ in., elliptic, acute; bracteoles $\frac{1}{3}$ in. *Sepals* much imbricated, outer $\frac{1}{3}$ in., rigid, subscarious. *Corolla* glabrous; tube $\frac{3}{4}$ by $\frac{1}{12}$ in.; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in. *Capsule* $\frac{1}{3}$ in., glabrous.—Wallich's and Griffith's Nepal and Sikkim specimens, treated as wild by Nees and T. Anderson, are no doubt cultivated ones.

XXV. **ASYSTASIA,** *Blume.*

Herbs or undershrubs. *Leaves* entire. *Spikes* or *racemes* lax or dense, simple or compound, 1-sided or suberect; bracts and bracteoles linear, shorter than the calyx (except in *A. Lawiana*); flowers opposite or alter-

nate, usually solitary, blue purple rose or yellow. *Sepals* narrow. *Corolla-tube* short or long, funnel-shaped ventricose or narrow; lobes 5, subequal, imbricate in bud. *Stamens* 4, all perfect, didynamous, subequal; anthers oblong, cells parallel, approximate, base minutely spurred or submuticous, the points only obscurely whitened. *Ovary* 4-ovulate, very hairy; stigma minutely bifid or subcapitate. *Capsule* elliptic, 4-seeded, base contracted solid. *Seeds* compressed, orbicular or irregularly angular, rugose or tubercular, glabrous.—Species 15, Tropical Asiatic and S. African.

The species having only 2 fertile stamens are transferred to *Eranthemum*, and those with large bracts to *Lepidagathis*. It might be better to sink *Asystasia* in *Eranthemum*, for many of the species have a long narrow corolla-tube as in *Eranthemum*, and the character of the stamens appears of rather less value than in separating *Hemiadelphis* from *Hygrophila*.

* *Corolla tubular-ventricose, about ¾–1¼ in. long.*

1. **A. intrusa,** *Blume Bijd.* 796, *not of Nees*; leaves ovate or ellliptic acuminate puberulous above, calyx subsessile glabrous or minutely ciliate, corolla ¾–1 in. tube exceedingly slender. A. Blumei, *Nees in DC. Prodr.* xi. 167. A. nemorum, *Nees in Wall. Pl. As. Rar.* iii. 90, *as to descr. and Malay material.*

SINGAPORE; *Schomburgk.*—DISTRIB. Java.

Stems 1 foot, dichotomous, slender, nearly glabrous. *Leaves* 2 by ¾ in., base cuneate or rhomboid, undulate, subcrenate, dotted with most minute hairs above, glabrous beneath; nerves 5–6 pair; petiole ¼ in. *Spikes* 1–2 in., slender; flowers mostly opposite; bracts scarcely $\frac{1}{20}$ in.; lowest pedicels subobsolete. *Calyx* ⅛ in.; segments linear-lanceolate, glabrous on the back. *Corolla* glabrous; tube hardly $\frac{1}{12}$ in. diam.; limb hardly ½ in. in expanse. *Stamens* 4, nearly equal. *Style* nearly glabrous; stigma subcapitate. *Capsule* ½ in., 4-seeded, minutely hairy.—This differs from *A. coromandeliana* (and its allies) in the very slender corolla; the tube is widened only near its apex, and is there scarcely ⅛ in. broad.

2. **A. coromandeliana,** *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 165; grey puberulous, leaves ovate acute some rounded or suddenly narrowed at base, lower pedicels manifest, corolla 1–1¼ in. inflated part of the tube much longer than its cylindric base. *Dalz. & Gibs. Bomb. Fl.* 186. A. plumbaginea, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164. A. gangetica, *T. Anders. in Thwaites Enum.* 235. A. violacea, *Bot. Mag.* t. 5882. Justicia Gangetica, *Linn. Amœn. Acad.* iv. 299. J. plumbaginea, *Wall. Cat.* 2487. Ruellia secunda, *Vahl Symb.* iii. 84; *Wall. Cat.* 2401. R. Digitalis, *Koen.*; *Spreng. Syst.* ii. 825; *Nees l. c.* xi. 153. R. zeylanica, *Koen.*; *Roxb. Fl. Ind.* iii. 42. R. Coromandeliana, *Wall. Cat.* 2399, *partly.*—*Rheede Hort. Mal.* ix. t. 45.

DECCAN PENINSULA and CEYLON, common.—DISTRIB. Malaya, Africa, Arabia.

A procumbent, perennial weed, 1–2 ft., usually dusky pubescent. *Leaves* 1–1⅓ in., lower mostly subcordate, base rounded or suddenly narrowed; nerves 5–6 pair; petiole ⅓ in. *Racemes* 2–5 in., lax; lower pedicels often attaining ⅙ in.; bract and bracteoles at the base of the pedicel, about $\frac{1}{12}$ in. *Sepals* ⅓ in., linear-lanceolate, puberulous or pubescent on the back. *Corolla* pubescent; tube yellow, limb pink or pale purple, usually dull or lurid, sometimes yellow altogether. *Filaments* with few small hairs. *Style* glabrous except near the base. *Capsule* 1 in., pubescent; solid cylindric compressed base ⅓ in. *Seeds* ⅙ in. diam., much compressed, ovoid angular wrinkled or subtubercular glabrous.

3. **A. chelonoides,** *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164; leaves elliptic narrowed at both ends minutely hairy or

glabrate, racemes compound many-fld., lower pedicels longer than the pubescent calyx, corolla ⅜–⅝ in. purple. *T. Anders. in Thwaites Enum.* 236.

CEYLON; *Walker, Thwaites,* &c. TRAVANCORE and TINNEVELLY HILLS; *Beddome* (wild).—DISTRIB. Cultivated in S. India and Malabar.

Leaves 5½ by 1¾ in., lower all cuneate or acuminate at the base, punctate or puberulous or with scattered hairs (without the dull grey pubescence of *A. coromandeliana*); nerves 6–8 pair. *Racemes* usually panicled, often peduncled, sometimes 50–60-fld.; lower pedicels ⅛–⅓ in. *Capsule* nearly of *A. coromandeliana.*—Described from Nees' type specimen marked *A. chelonoides,* Var. *α,* in Nees' hand. It is the species with numerous small purple flowers much cultivated in S. India; and Col. Beddome believes it to be wild in S. Malabar, but there are no specimens except from Ceylon.

VAR. *amœna*; more hairy, leaves hairy on both surfaces, sepals subhirsute, corolla as of *A. chelonoides,* type.—Arracan; forests near Akyab, *Kurz.*

VAR. *quadrangularis*; stem acutely quadrangular, leaves ovate or narrowly lanceolate glabrate, corolla small as of *A. chelonoides,* type. A. coromandeliana, Var. variabilis, *Nees in DC Prodr.* xi. 165. A. nemorum, Var. *β, T. Anders. in Journ. Linn. Soc.* ix. 525. Ruellia quadrangularis, *Heyne in Herb. Rottler.*—Wynaad; *Rottler.* Anamallays; *Bedd.* Ceylon; *Macrae, Thwaites.*—Leaves very variable; in Macrae's example 1 by ⅜ in., in Beddome's 7 by 1 in., in Thwaites' 2½ by ½ in.

4. **A. violacea,** *Dalz. ms., not in Hook. Kew Journ.* ii. 139; leaves large subovate lower narrowed at base, lower pedicels shorter than the hairy calyx, corolla 1¼–1½ in. fine blue. A. chelonoides, *Nees in DC. Prodr.* xi. 164, Var. *β only*; *T. Anders. in Journ. Linn. Soc.* ix. 525, *chiefly.* A. nemorum, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167 (except the Nilgiri material). A. coromandeliana, *Bot. Mag.* t. 4248. Ruellia filiformis, *Heyne in Herb. Rottler.* R. coromandeliana, *Wall. Cat.* 2399, *type sheet partly.*

W. DECCAN PENINSULA, alt. 2–6000 ft., frequent; *Rottler,* &c.

Leaves often 6½ by 2¾ in., membranous, green, sparsely pubescent or glabrate. *Calyx-segments* nearly ⅓ in., narrowly oblong, acute. *Capsule* 1–1¼ in.—Described from specimens named by himself, which are identical with Wight's Herb. Propr. n. 1952. In his original description Dalzell says the flowers of *A. violacea* are about half as large as those of *A. coromandeliana,* and the description appears to belong altogether to *A. chelonoides,* Nees' type; but in *Dalz. & Gibs. Bomb. Fl.* 186 the character of *A. violacea* is at once shortened and widened.

5. **A. crispata,** *Benth. in Linnæa* 1851, 647; leaves elliptic or oblong acuminate lower narrowed into the petiole repand crispately crenulate glabrate, lower pedicels shorter than the pubescent calyx, corolla 1 in. white with rose or dark purple dots in the palate. *T. Anders. in Journ. Linn. Soc.* ix. 526. A. nemorum, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167, *as to the Nilgiri material*; *T. Anders. in Journ. Linn. Soc.* ix. 524. A. coromandeliana, *Wight Ic.* t. 1506, *not of Nees.* Ruellia chelonoides, *Wall. Cat.* 2335 *chiefly,* not Asystasia chelonoides, Nees.

MTS. of S. DECCAN PENINSULA, alt. 4–8000 ft.; *Rottler, Wight,* &c., common about Ooty.

Leaves very variable in width, nearly always crisped subcrenulate; upper often sessile, with base rounded. *Flowers* very constant in colour. *Capsule* as of *A. coromandeliana.*—This species (as also *A. chelonoides*) is so closely allied to *A. coromandeliana* that Col. Beddome says he can hardly distinguish them but by the colour of the flower. They sort out pretty well in the Herbarium, and among the large non-Indian material there is nothing like *A. chelonoides* or *crispata.*

6. **A. travancorica,** *Bedd. Ic. Pl. Ind. Or.* t. 178; leaves elongate-

lanceolate sparingly pubescent, lower pedicels often longer than the calyx, corolla $1\frac{1}{4}$–$1\frac{1}{2}$ in. purple-violet (or in cultivation white).

TRAVANCORE, S. TINNEVELLY and ANAMALLAYS, alt. 3000 ft.; *Beddome.*
A large shrub, 6–8 ft. high; branches pubescent upwards. *Leaves* 4–5 by $\frac{3}{4}$–$1\frac{1}{4}$ in., base cuneate or rhomboid; nerves 7–9 pair, very oblique; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 2–8 in., pubescent; lower pedicels sometimes $\frac{1}{2}$ in. *Capsule* 1 in., nearly as of *A. coromandeliana.*—Closely allied to *A. coromandeliana,* though the elongate oblique-nerved leaves give it a very different aspect.

7. **A. macrocarpa,** *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 163; pubescent, leaves oblong or elliptic narrowed at both ends, racemes dense or elongate very pubescent, corolla $1\frac{1}{4}$ in. dull pink, cylindric base of its tube much shorter than the ventricose part. *T. Anders. in Journ. Linn. Soc.* ix. 525. Ruellia macrocarpa, *Wall. Cat.* 2348.—Acanthacea, *Griff. Itin. Notes,* 106, n. 92, and *Ic. Pl. As.* t. 438.

SUBTROPICAL HIMALAYA, from Kumaon to Bhotan; in the Terai, alt. 1000 ft., and in the hotter valleys ascending to 4000 ft.
A diffuse, rambling undershrub, 1–4 ft. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in.; nerves 8 pair; petiole $\frac{1}{3}$ in. *Racemes* usually condensed, 1-sided; sometimes 3–4 in., erect, lax, with opposite flowers; lower pedicels 0–$\frac{1}{6}$ in.; bracts $\frac{1}{8}$ in. *Sepals* $\frac{1}{4}$ in., linear-lanceolate, pubescent. *Corolla* pubescent. *Stamens* 4, perfect; anther-cells distinctly spurred at the base. *Capsule* $1\frac{1}{3}$ in., pubescent; cylindric base $\frac{3}{8}$ in. *Seeds* $\frac{1}{4}$ in. diam., much compressed, tubercular, rugose, glabrous.

8. **A. lanceolata,** *T. Anders. in Journ. Linn. Soc.* ix. 524; leaves lanceolate acuminate glabrous, bracts lanceolate acute villous as long as the calyx, corolla 1 in. funnel-shaped constricted base of the tube short.

BURMA; Baragyn, *Brandis* (*T. Anderson*).
An erect, glabrous herb; stem terete, sparingly branched, internodes long. *Leaves* 4–6 by $1\frac{1}{2}$ in., undulate; petiole short. *Spikes* terminal, erect; bracts opposite, $\frac{1}{4}$ in., subherbaceous, lax, decussate, somewhat remote; flowers sessile, 1 or 2 in the axil of each bract. *Sepals* linear, equal, villous, membranous. *Corolla* villous without; lobes 5, unequal, small, erect. *Anther-cells* 2, bases mucronate.—Not seen.
VAR. ? *Beddomei*; leaves linear-lanceolate hairy on both surfaces, corolla $1\frac{1}{2}$ in. and upwards before expansion.—Tenasserim, Mooleyit, *Beddome.*—*Leaves* 8 by $\frac{3}{4}$–1 in., caudate-acuminate, widest close to the rounded or subcordate base; petiole 0–$\frac{1}{16}$ in. *Spikes* compound, most of the lower bracts and calyces small without flowers; upper bracts $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate, glabrate. *Corolla* broad, nearly straight, urn-shaped on a short cylindric base; lobes subequal, $\frac{1}{3}$ in., ovate, obtuse. *Stamens* 4, 2 conspicuously longer; anthers 2-celled, cells broadly oblong, parallel, equal, white-apiculate at base. *Pistil* as of *Asystasia.* *Capsule* not seen.

** *Corolla linear shortly funnel-shaped upwards about 2 in. long.*

9. **A. atroviridis,** *T. Anders. in Journ. Linn. Soc.* ix. 526; leaves large elliptic acuminate at both ends nearly glabrous, racemes condensed nearly glabrous, corolla 2 in. rose-pink tube very long linear. Ruellia atroviridis, *Wall. Cat.* 2404.—Asystasia sp. n. 15, *Herb. Ind. Or. H. f. & T.* Verbenacearum sp., *Nees in DC. Prodr.* xi. 155.

KHASIA MTS., alt. 0–3000 ft., frequent; *Wallich, Griffith, H. f. & T.,* &c.
Stems 1–3 ft., herbaceous. *Leaves* $8\frac{1}{2}$ by $3\frac{1}{4}$ in.; nerves 10–14 pair; petiole $1\frac{1}{4}$ in. *Racemes* usually paniculate in a dense terminal subsessile head; bracts $\frac{1}{12}$ in.; pedicels $\frac{1}{8}$ in., often pubescent. *Sepals* $\frac{1}{2}$ in., sublinear, glabrous or pubescent. *Corolla* glabrous, linear portion of the tube $1\frac{1}{4}$ in., limb about 1 in. diam. *Stamens* 4, glabrous; anthers muticous, or very obscurely mucronate at the base. *Capsule*

$1\frac{1}{4}$ in., with the seeds nearly as of *A. macrocarpa.*—The name is very misleading; the corolla is always a fine rose. In one example the raceme is developed into a lax very compound panicle, and the plant is noted as 6 ft. high.

10. **A. Neesiana,** *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164; leaves large broadly elliptic acute sparingly pubescent, racemes elongate very lax pubescent, corolla 2 in. pink tube very long linear. *T. Anders. in Journ. Linn. Soc.* ix. 526. Ruellia Neesiana, *Wall. Pl. As. Rar.* i. 73, t. 83, and *Cat.* 2342.—Asystasia sp. n. 14, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 0–3000 ft., frequent; *Wallich,* &c. CACHAR; *Keenan.* MOULMEIN; *Parish.*

Leaves 8 by 3 in., lower long-petioled, uppermost pair usually (not always) sessile. *Raceme* often nearly a foot long, very pubescent. *Corolla, capsule* and *seeds* nearly as of *A. atroviridis. Anther-cells* minutely mucronate at the base.

DOUBTFUL SPECIES.

11. A. ? KUNTHIANA, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 163; leaves oblong or elliptic acuminate at both ends pubescent beneath, spikes dense few-fld. on very short axillary peduncles. *T. Anders. in Journ. Linn. Soc.* ix. 525. Ruellia Kunthiana, *Wall. Cat.* 2419.

PENANG; *Wallich.*

Stems creeping, rooting; branches 1 foot, erect, subterete, glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., lineolate above; petiole scarcely $\frac{1}{4}$ in. *Peduncles* 0–$\frac{1}{6}$ in.; spikes $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous, lineolate; bracts $\frac{1}{18}$ in. *Sepals* $\frac{1}{4}$ in., linear. *Capsule* $\frac{1}{3}$ in., constricted for a short space at the base, 4-seeded, glabrous. *Flowers* not seen.—T. Anderson does not doubt this being an *Asystasia,* but it might quite as well be a *Justicia.*

12. A.? Eranthemum montanum, *Bot. Mag.* t. 4031, *not of Roxb.*; leaves elliptic acuminate at both ends glabrate, racemes lax compound puberulous, sepals linear-subulate ciliate, corolla $2\frac{1}{4}$ in. purple tube very long linear.

"INDIA;" cultivated formerly at Kew.—Upper *leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in.; nerves 7 pair; petiole $\frac{1}{3}$ in. *Peduncle* 3 in., grey puberulous; panicle lax; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., linear-lanceolate, much shorter than the calyx; lower pedicels 0–$\frac{1}{8}$ in. *Sepals* $\frac{1}{2}$ in. *Corolla* glabrous. *Stamens* 4 perfect, subsimilar, glabrous; anther-cells 2, bases acute. *Stigma* minutely equally bifid.—A plant of which nothing is known, but the excellent figure cited, and the specimen from which it was taken. The description is incorrect as to the 2 stamens, of which there are 4, hardly at all didynamous. The minute bracts are as in *Asystasia,* and will not do for *Dædalacanthus.* Its true place is, in the absence of fruit, uncertain.

13. A. LAWIANA, *Dalz. in Hook. Kew Journ.* iv. 344; leaves elliptic acute at both ends very sparsely hairy, spikes short-oblong dense softly-hairy, bracts large imbricated, corolla $\frac{1}{2}$–$\frac{2}{3}$ in. white. *Dalz. & Gibs. Bomb. Fl.* 186. A. mysurensis, *T. Anders. in Journ. Linn. Soc.* ix. 524. Ruellia mysurensis, *Roth Nov. Sp.* 303; *Wall. Cat.* 2402. Strobilanthes mysurensis, *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 192.

W. DECCAN PENINSULA; from Saugur to Kurg, frequent; *Rottler,* &c.

Stem herbaceous, erect, thinly hairy. *Leaves* 4 by $1\frac{3}{4}$ in., with few distant multicellular hairs above, minutely lineolate, puberulous beneath; petiole $1\frac{1}{2}$ in. *Flower-heads* $1\frac{1}{2}$ by $\frac{3}{4}$ in., substrobiliform; bracts $\frac{3}{4}$–1 by $\frac{1}{4}$ in., broadly lanceolate, softly hirsute; bracteoles $\frac{2}{3}$ in., lanceolate membranous. *Sepals* $\frac{1}{4}$ in., linear hairy. *Stamens* slightly didynamous, nearly glabrous; anthers 2-celled; cells ovate or sub-ellipsoid, muticous, one slightly above the other. *Style* glabrous; stigma very minutely bifid; ovary pubescent. *Capsule* $\frac{3}{4}$ in., 4-seeded; solid cylindric base $\frac{1}{3}$ in. *Seeds* compressed, angular; testa minutely laxly hexagonal, glabrous.—Very unlike the genus in the bracts, corolla, anthers, and habit, in which it more resembles *Strobilanthes micranthus.*

XXVI. **ERANTHEMUM,** *Linn.*

Stamens 2 fertile, 2 rudimentary or 0. *Ovary* often glabrous. Otherwise as *Asystasia*.—Species 30, tropics of both hemispheres.

E. diantherum, *Roxb. Fl. Ind.* i. 112, *Wall. Pl. As. Rar.* iii. 108, and E. racemosum, *Roxb. l. c.* 113, *Wall. l. c.* 107, *DC. Prodr.* xi. 455, came from the Moluccas.—E. semperflorens, *Roth Nov. Sp.* 2, *Nees in DC. Prodr.* xi. 458, came from Martinique, nor is there reason from Roth's account to believe it otherwise than cultivated by Heyne.—Justicia sp., *Griff. Ic. Pl. As.* t. 426 (Kew Distrib. n. 6177), is a fine *Eranthemum*, collected in Ava, outside the bounds of British India.

* *Corolla tubular-ventricose.*

1. **E. indicum,** *Clarke*; leaves lanceolate or subovate acuminate at both ends glabrous, racemes dense puberulous or glabrate, corolla 1¼ in. white abundantly purple-veined. Thyrsacanthus indicus, *Nees in DC. Prodr.* ix. 325. Asystasia thyrsacanthus, *T. Anders. in Journ. Linn. Soc.* ix. 525.

SIKKIM and BHOTAN, alt. 1–5000 ft., frequent; *H.f. & T.*, &c. ASSAM, in the lower hills; KHASIA and JAINTEA MTS., alt. 1–4000 ft., frequent.

A diffuse undershrub, 1–4 ft. *Leaves* 7 by 2½ in.; nerves 5–7 pair; petiole ¼–¾ in. *Racemes* 1–5 in.; lower pedicels 0–⅛ in.; bracts ⅛–⅙ in., linear. *Sepals* ⅙ in., linear-lanceolate, glabrous or puberulous. *Corolla* distinctly 2-lipped, upper lip subentire emarginate galeate, lower 3-fid, middle lobe the widest. *Filaments* and *style* minutely hairy. *Capsule* 1⅓ in., base long, cylindric, solid. *Seeds* ¼ in., orbicular, tubercled, rugose, glabrous.—It is difficult to give a reason why this is not a *Thyrsacanthus*, except that it is not American; the curved subgaleate corolla does not agree well either with *Asystasia* or *Eranthemum*.

** *Corolla-tube linear-cylindric, often very narrow.*

2. **E. crenulatum,** *Lindl. in Bot. Reg.* t. 879, *not of Nees*; leaves lanceolate or elliptic acuminate at both ends, racemes slender glabrous or puberulous, flowers solitary, corolla pale purple or lilac tube ⅔ in. slender narrowly funnel-shaped upwards, ovary glabrous.

KHASIA TERAI, alt. 0–2000 ft., frequent; *Wallich, H.f. & T.*, &c.

Perennial; 18 in., glabrous. *Leaves* 6½ by 2 in., undulate-crenate; nerves 8 pair; petiole ⅓ in. *Racemes* in a terminal panicle with curved drooping slender branches; bracts ⅛ in., linear-lanceolate; pedicels 0–⅛ in. *Sepals* ⅙ in., sublinear, glabrous or puberulous. *Corolla-limb* obscurely 2-lipped, ½ in. diam. *Stamens* 2, subincluded. *Capsule* ¾ in.; cylindric base ⅓ in. *Seeds* ⅙ in., rugose, glabrous.—Lindley's picture is excellent, but shows a small example in young flower; the panicle is often 8–12 in. diam., the flowers becoming distant on the branches. The species has been quite lost sight of by Nees and T. Anderson, Hooker's examples having (probably from the short corolla) been referred to *Codonacanthus*.

3. **E. malabaricum,** *Clarke*; leaves elliptic or ovate narrowed at both ends glabrous, spikes glabrous or puberulous, corolla white or yellowish tube 1–1¼ in., ovary glabrous. E. crenulatum, *Wall. Cat.* 2491; *Dalz. & Gibs. Bomb. Fl.* 195; *T. Anders. in Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 523, *chiefly*. Justicia latifolia, *Vahl Symb.* ii. 4?

W. DECCAN PENINSULA, frequent; *Wight, Hohenacker*. CEYLON; *Thwaites* (C. P. n. 1979).

Suffrutescent, 2 ft. high. *Leaves* 5 by 2¼ in., undulate-crenulate, minutely lineolate on both surfaces; nerves 6–7 pair; petiole ⅓ in. *Spikes* 4–9 in.; lowest pedicels obsolete in fruit; bracts ⅓ in., linear-lanceolate. *Sepals* ⅙ in., sublinear,

glabrous or puberulous. *Corolla-tube* linear, only slightly widened close to the apex; limb 1–1¼ in. diam., obscurely 2-lipped. *Capsule* ¾ in., cylindric base ⅓ in. *Seeds* ⅙ in., rugose, subtubercled glabrous.—Vahl's description agrees pretty well with this Malabar species, and he received his examples from Koenig; but his reference to Rheede Hort. Mal. ix. t. 44 (which has extremely different flowers) throws a doubt on the identification. Nees says his *E. crenulatum* was founded *entirely* on material from Silhet to Malacca, and therefore it should not belong to *E. malabaricum*, even in part; but in fact a good deal of Nees' material came from Malabar.

4. **E. palatiferum,** *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 457; leaves elliptic acuminate at both ends pubescent on the midrib beneath or ultimately glabrate, racemes pubescent flowers often fascicled, corolla pale-purple tube 1¼–1½ in. linear, ovary pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 524. Justicia palatifera, *Wall. Pl. As. Rar.* i. 80, t. 92. J. rubicunda, *Ham. in Wall. Cat.* 2480.

SUBTROPICAL SIKKIM and BHOTAN, alt. 0–3000 ft., frequent; *Treutler*, *Gamble*, &c. ASSAM and KHASIA MTS., alt. 0–3000 ft., common; *Wallich*, *Griffith*, &c.

Perennial, 3 ft.; stems pubescent upwards. *Leaves* 7 by 2–3 in., very obscurely (or not) lineolate; nerves 8–10 pair; petiole ⅓ in. *Racemes* often one foot long, pubescent; bracts ⅛–⅙ in., sublinear; lower pedicels rarely attaining ⅙ in. *Sepals* ⅓ in., linear, pubescent. *Corolla-tube* linear almost to its apex; limb 1¼ in. diam., obscurely 2-lipped; purple often with a yellowish spot on the middle lobe of the lower lip. *Capsule* nearly 1 in., pubescent. *Seeds* ⅙ in. diam., reticulate-rugose, glabrous.

VAR. *levicapsa*; leaves more conspicuously lineolate on the upper surface, spikes long slender in more or less compound panicles, flowers often slenderer, capsule less pubescent usually soon glabrate. E. crenulatum, *Wall. Cat.* 2491, *letter* F.—Chittagong, alt. 0–2000 ft., frequent; *H. f. & T.*, &c. Pegu, *M'Lelland.* Mergui, *Griffith.* Attran, *Wallich.*

VAR. *elata*; leaves large uppermost petioled elongate-cuneate at the base. E. elatum, *Kurz in Journ. Bot.* 1872, 46, and 1873, 47. E. latifolium, *Kurz in Flora* 1870, 363 excl. syn. ?—Pegu, Yomah, *Kurz.* Rangoon, *M'Lelland.*—Kurz notes that this species produces on the same plant dimorphous flowers; one kind as of *E. palatiferum* type, the other (usually the upper ones in the spike) about ⅓ in. long, which chiefly produce fruit. Similar dimorphic flowers occur in typical Khasian *E. palatiferum.*

5. **E. album,** *Nees in DC. Prodr.* xi. 455; leaves elliptic acuminate puberulous on the midrib beneath or glabrate, spikes panicled minutely pubescent, corolla white tube 1¼ in. linear. *T. Anders. in Journ. Linn. Soc.* ix. 523. E. crenulatum, *Wall. Cat.* 2491, *letters* D, E. Justicia alba, *Roxb. Fl. Ind.* i. 116, and *Ic. Ined. in Herb. Kew.*

ANDAMANS; *Roxburgh*, *Kurz.* PEGU; *Brandis.* CHITTAGONG; *J. D. H.* PENANG; *Wallich.* NICOBARS; *Kurz.*

Stem woody upwards, bark whiteish. Uppermost *leaves* very shortly petioled, base usually rounded, but in Roxburgh's picture (and in the Chittagong example) cuneate.—This, when dry, seems very difficult to separate from *E. palatiferum*, Nees, Var. *levicapsa*, except by the woodiness of the stems, almost to the panicle as shown in Roxburgh's picture and in Kurz's and Hooker's examples; the stems in *E. palatiferum* being distinctly herbaceous unless very near the base.

6. **E. malaccense,** *Clarke*; leaves broad-lanceolate minutely pilose on the midrib beneath, spikes 1–3 subterminal puberulous or pubescent, corolla pale-purple tube 1–1½ in. linear, ovary nearly glabrous. E. crenulatum, *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 453, *chiefly*; *T. Anders. in Journ. Linn. Soc.* ix. 523, *partly* (*not of Lindl.*). E. palatiferum, *Bot. Mag.* t. 5957, *left-hand fig. only.* Justicia orbiculata, *Wall. Cat.* 2489, *letter b.*

MALACCA; *Griffith* (Kew Distrib. n. 6175), *Cuming*, nn. 2357, 2389, &c.

An undershrub, 4 ft. high. *Leaves* 5½ by 1¼ in., acuminate, base cuneate, obscurely or obsoletely lineolate; nerves 5–6 pair, much curved, usually crispedly pubescent when young; petiole ½ in. *Spikes* 2–5 in., fuscous-puberulous, few- or little-branched, never forming a lax panicle; bracts $\frac{1}{10}$ in.; lower pedicels very short. *Flowers* and *fruits* very nearly as of *E. palatiferum*. Young *capsule* sometimes sparsely pilose, soon glabrous.—This plant seems plentiful at Malacca, and probably occurs in the Malay Isles, but does not exactly agree with any Malay species at Kew, nor with the descriptions of the Dutch botanists. It may (ex descr.) possibly be E. punctatum, *Nees in DC. Prodr*, xi. 455.

7. **E. Andersoni,** *Masters in Gard. Chron.* 1869; leaves large lanceolate acute at both ends glabrous, spike very long linear flower-clusters whorled below, bracts and calyces glabrous or puberulous, corolla-tube 1½–1¾ in. *Bot. Mag.* t. 5771. E. elegans, *Masters l. c.* 1868, p. 1234, *not of Br.* E. Blumei, *Teijs.? Miq. Fl. Ind. Bat.* ii. 836; *T. Anders. Journ. Linn. Soc.* ix. 523; *Kurz in Flora* 1870, 363.

SINGAPORE; *T. Anderson.*—DISTRIB. Malaya.

Upper *leaves* 5 by 1½ in.; petiole ⅜ in. *Spike* (coming into flower) 10 in.; lower clusters distant, many-fld., upper few-fld., continuous; bracts ⅛ in. *Calyx* ¼ in.; lobes linear-lanceolate. *Corolla* white, pubescent; lobes ⅜ by ¼ in. *Capsule* not seen. —Described from T. Anderson's Singapore example. The name should be *E. Blumei*, but there is no authentic example of that for comparison; nor is it known whether, by recording *E. Blumei* among the Indian *Acanthaceæ*, T. Anderson alluded to his Singapore plant.

8. **E. cinnabarinum,** *Wall. Pl. As. Rar.* i. 20, t. 21, and *Cat.* 9088; leaves large elliptic acuminate at both ends glabrous, spikes rather short rigidly panicled fuscous-puberulous, corolla crimson tube 1½ in. linear. *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 453; *T. Anders. in Journ. Linn. Soc.* ix. 524. E. palatiferum, *Bot. Mag.* t. 5957, *right-hand fig.*

LOWER BURMA and TENASSERIM; *Wallich, Parish, Beddome.*

Leaves 8½ by 2½ in., undulate-crenulate; raphides sunk, obscure; nerves 8–11 pair; petiole ½–1½ in. *Panicles* compound, stout; branches short, patent or ultimately recurved; flowers subsessile, often fascicled; bracts ⅛ in., linear. *Sepals* ⅛ in., sublinear. *Corolla-tube* linear to the apex; limb 2-lipped, lobes of the lower lip wider than those of the upper; eye often more intensely crimson, sometimes a yellowish spot on the middle lobe of the lower lip.

VAR. *succisifolia*; flowers white. *E. succisifolium*, Kurz in Journ. As. Soc. 1876, pt. ii. 142.—Nicobars; *Kurz.*—The dried examples show no good distinction between this and *E. cinnabarinum*; the leaves have rather fewer nerves than in Wallich's specimen, but not than in his picture; the flowers are hardly smaller than Wallich's; the capsules are ¾ in., altogether as of the genus.

9. **E. Parishii,** *Clarke*; leaves elliptic acuminate at both ends glabrous, spikes puberulous or pubescent subpanicled, flowers often fascicled, corolla purplish-pink tube 1½ in. distinctly funnel-shaped upwards. E. crenulatum *var.* grandiflora, *Hook. f. in Bot. Mag.* t. 5440. Asystasia Parishii, *T. Anders. in Journ. Linn. Soc.* ix. 526.

MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

Leaves 4½ by 1¼–1½ in., very acute, variegated in all the wild examples, densely puncticulate not lineolate above; nerves 6 pair; petiole ¾ in. *Spikes* 2–5 in., suberect; bracts ⅛ in. *Sepals* ⅛ in., linear-lanceolate, pubescent. *Corolla-tube* linear below, upper ⅓ part distinctly widened subinflated; limb ¾ in. diam., segments subequal. *Anthers* subexsert. *Ovary* glabrous or very nearly so.—In Bot. Mag. t. 5440, the stamens are figured 4 subequal; in the accompanying text they are said to be 2 or 4. Wild specimens have 2 perfect and 2 minute rudimentary stamens.

10. **E. leptanthus,** *Clarke*; leaves elliptic acuminate at both ends glabrous, racemes elongate many-fld. subglabrous, corolla small tube ¼–⅓ in. linear curved.

MISHMEE HILLS; *Griffith* (Kew Distrib. n. 6181).

Apparently a large herb; branches subterete, glabrous. *Leaves* 7½ by 2¼ in., not or very obscurely lineolate; nerves 11–16 pair; petiole 1–1½ in. *Racemes* 5–9 in., 1–5 subterminal, nearly simple; pedicels fascicled, unusually long, upper often ⅙ in.; bracts at the base of the pedicels, minute, linear. *Sepals* ⅛ in., linear-lanceolate, glabrous, margins puberulous. *Corolla* glabrous; tube linear, slightly inflated, base gibbous; limb subequally 5-lobed. *Stamens* 2, with 2 minute linear rudiments; filaments somewhat ligulate, glabrous; anthers oblong; cells straight, parallel, muticous, on the same level exactly. *Pistil* glabrous; disc annular; ovary 4-ovulate; stigma minute, obscurely bifid. *Capsule* not seen.—A species differing widely from all others, but referred by Mr. Bentham to this genus, of which it appears to possess all the essential characters.

SPECIES IMPERFECTLY KNOWN.

11. E. GRACILIFLORUM, *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 454; leaves 8 by 3½ in. elliptic acute at both ends subglabrous, nerves 7-9 pair puberulous beneath, petiole 2–3½ in. puberulous, thyrse 4 in. dense-fld. and densely pubescent, pedicels 0–⅛ in., bracts ⅛ in. linear, sepals ⅛ in. pubescent, corolla-tube 1½ in. linear for ⅓ its length. Justicia graciliflora, *Wall. Cat.* 2427.—Penang Mts.; *Wallich* (specimens without fruit, and with only a very imperfect flower).

12. E. BIFARIUM, *Nees in DC. Prodr.* xi. 458; leaves ovate attenuate at both ends glabrate, spike small puberulous, flowers solitary opposite, bracts and bracteoles linear-subulate shorter than the calyx. Gendarussa bifaria, *Wall. Cat.* 7173; *Nees in Wall. Pl. As. Rar.* iii. 104.—Pegu; Pingee, *Wallich.*—*Leaves* 7 by 3¼ in., entire, minutely lineolate on both surfaces; petiole 1½ in., puberulous. *Spike* (one only seen) 2½ in., puberulous; flowers ⅓ in. apart. *Calyx-segments* ¼ in., linear, puberulous. *Corolla* not seen. *Capsule* ¾–1 in., altogether of *Eranthemum.*—Nees founded this on the 2 opposite lines of minute crisped hairs near the tips of the branches; which may be seen in *E. album, malaccense* and others. The solitary example of *E. bifarium* in Herb. Wallich differs from the neighbouring species in its depauperated spike and long-petioled leaves, but it is impossible to say that it may not be one of them.

13. E. PUBESCENS, *Roth Nov. Sp.* 1; leaves ovate obtuse, spikes terminal subdistichous, bracts imbricated obovate-oblong mucronate keeled densely pubescent, calyx unequal scarious. *Nees in DC. Prodr.* xi. 458.—India; *Heyne.*—A shrub; branches subtetragonous, ashy farinose. *Leaves* from oblong to ovate, nearly entire, nervose, paler beneath, farinose; petiole 1 in. *Spike* terminal, 3 in., enveloped at base by 4 or 5 ovate acute bracts; proper bracts ½ in., dense clothed with capitate hairs; bracteoles 2, linear-subulate. *Calyx* 5-leaved, 2 lanceolate subulate, 1 broader 2-nerved sub-bifid, 2 smaller. *Corolla* showy, pubescent without; tube 1 in. filiform, limb of 5 subequal round lobes. *Stamens* 2 with oblong villous anthers, 2 sterile very short. *Style* long, tip semi-bifid. *Capsule* oblong-ovoid, 4-seeded. *Seeds* brown, compressed, ovate subrotund, under a lens elegantly clothed with imbricated adpressed ferruginous scales.

XXVII. CODONACANTHUS, *Nees.*

Corolla small ventricose nearly from the base.—Otherwise as *Eranthemum.*

The solitary species differs from *Eranthemum indicum* in its very small flowers; from *E. leptanthus* in its ventricose corolla.

C. pauciflorus, *Nees in DC. Prodr.* xi. 103; leaves elliptic acuminate at both ends pubescent on the nerves beneath or glabrate,

flowers ⅓ in. many of them distinctly pedicelled. *T. Anders. in Journ. Linn. Soc.* ix. 524. C. acuminatus, *Nees l. c.* Ruellia pauciflora, *Wall. Cat.* 2369. Asystasia pauciflora, *Nees in Wall. Pl. As. Rar.* iii. 90.

KHASIA HILLS, alt. 0–3000 ft., and ASSAM; *Wallich, Jenkins, H.f. & T.*, &c. CHITTAGONG HILLS; *Clarke*.—DISTRIB. S. China.

An erect herb. *Leaves* 5 by 1¼–2 in.; petiole ⅓ in., usually pubescent. *Racemes* in the Indian examples forming very compound, slender, terminal, lax panicles; bracts minute linear; pedicels often ⅛–⅙ in. *Sepals* ⅛ in., linear-lanceolate. *Corolla* glabrous, pink or whiteish; cylindric base of the tube scarcely $\frac{1}{16}$ in.; lobes 5, ovate, subequal. *Stamens* 2, with 2 minute linear rudiments. *Capsule* ½ in.; base cylindric, solid. *Seeds* 4 as of *Eranthemum*, but nearly smooth, scarcely rugose.—The Chinese examples all differ from the Indian in their much simpler inflorescence. Bentham, in allowing the genus 2 species in the Gen. Pl., appears to think the Chinese plant distinct, but in the Flora of Hongkong he had united them.

XXVIII. **ANDROGRAPHIS,** *Wall.*

Annual herbs or very small shrubs, erect or procumbent. *Leaves* entire. *Racemes* axillary and terminal, lax, often compound subpanicled, or dense or subcapitate, sometimes reduced and 1-fld., frequently 1-sided; bracts small; bracteoles minute or 0. *Sepals* narrow. *Corolla* small, tubular, 2-lipped, white or pink with dark-purple lower lip, pubescent. *Stamens* 2; filaments ciliate or setulose; anthers exserted, 2-celled; cells oblong, parallel, muticous, subequal, base bearded. *Ovary* 6–12-ovulate, thinly hairy; style slender, tip minutely bifid. *Capsule* linear-oblong or elliptic, compressed contrary to the septum, 6–12-seeded. *Seeds* osseous, subquadrate or oblong, not compressed, rugose-pitted, glabrous.—Endemic in India; the 17 species being very closely connected, and identical as to form and colour of flower, and as to seeds.

* *Capsule linear, thrice as long as broad.*

† *Racemes elongate often loosely subpaniculate, lower flowers distant.*

1. **A. paniculata,** *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC. Prodr.* xi. 515; leaves lanceolate glabrous, racemes lax paniculate divaricate, pedicels manifest, capsule nearly glabrous. *Wight Ic.* t. 518; *Dalz. & Gibs. Bomb. Fl.* 198; *T. Anders. in Journ. Linn. Soc.* ix. 502; *Bentl. & Trim. Med. Pl.* t. 197. Justicia paniculata, *Burm. Fl. Ind.* 9; *Wall. Cat.* 2454; *Blume Bijd.* 788; *Roxb. Fl. Ind.* i. 117.—*Rheede Hort. Mal.* t. 56.

Throughout INDIA from Lucknow and Assam to Ceylon (probably introduced in some of the northern stations).—DISTRIB. Cultivated in the E. and W. Indies.

An erect annual, 1–3 ft.; stems quadrangular, base not pubescent. *Leaves* 2½ by ½–¾ in., narrowed at both ends, never spathulate, ovate at base, paler beneath; petiole 0–¼ in. *Racemes* 1–4 in.; pedicels 0–⅙ in., distant, usually pubescent; bract $\frac{1}{16}$ in., linear; bracteoles smaller or 0; inflorescence mostly sympodial, the pedicel in the axil of one of each pair of bracts suppressed. *Sepals* ⅛ in., linear-lanceolate, pubescent. *Corolla* ½ in., 2-lipped for at least half its length, hairy; white, spotted rose-purple. *Filaments* hairy upwards. *Ovary* and base of style subglabrous or very thinly hairy. *Capsule* ¾ by ⅛ in., young slightly glandular-hairy, mature glabrous. *Seeds* subquadrate, osseous, rugose, without hairs or scales at any period, wet or dry, yellow or deep brown.—Bentley and Trimen's figure is erroneous as to the seeds being hairy. Nees and others have doubted this being Roxburgh's *Justicia paniculata*, because Roxburgh says the bracts are large; but Roxburgh regards the reduced leaves at the base of the racemes as bracts, and does not notice the true small bracts at the base of the pedicels.

2. **A. subspathulata,** *Clarke*; leaves subspathulate elliptic minutely scabrid-punctate on both surfaces, racemes lax divaricate, pedicels manifest, capsule nearly glabrous.

MADRAS; Kurnool at the foot of the Nellymallays, *Beddome.*

In habit resembling *A. paniculata*; stem minutely hispid near the base. *Leaves* 3 by 1 in., apex scarcely acute, base suddenly narrowed; petiole $\frac{1}{2}$ in., often winged to the base. Lower *pedicels* $\frac{1}{3}$ in. *Corolla* $\frac{2}{3}$ in., similar to that of *A. paniculata,* but rather longer.—This has been considered a var. of *A. paniculata*; but points above noted as differential are constant.

3. **A. elongata,** *T. Anders. in Journ. Linn. Soc.* ix. 502; leaves petioled ovate-lanceolate pubescent or glabrate, spikes forming straggling panicles, sepals glabrate or minutely pubescent, anthers exsert not barbate, capsule nearly glabrous. Justicia elongata, *Vahl Enum.* i. 130. J. cordifolia, *Wall. Cat.* 2482. Cryptophragmium cordifolium, *Nees in Wall. Pl. As. Rar.* iii. 100. C. elongatum, *Nees in DC. Prodr.* xi. 95.

S. DECCAN PENINSULA; Courtallum, *Wight*; Tinnevelly Hills, *Beddome.*

Annual, erect, 2–3 ft.; branches divaricate, acutely quadrangular. *Leaves* 2 by 1 in., base somewhat suddenly narrowed or rarely subcordate; raphides inconspicuous; petiole often attaining $\frac{1}{4}$ in. *Panicles* often a foot each way; pedicels mostly very short. *Sepals* $\frac{1}{8}$ in., linear-lanceolate. *Corolla* $\frac{1}{3}$ in., tube curved, limb $\frac{1}{8}$–$\frac{1}{6}$ in., obscurely 2-lipped. *Filaments* flattened, glabrous or very nearly so, a little longer than the corolla; anthers glabrous. *Capsule* $\frac{3}{4}$ by $\frac{1}{8}$ in., compressed, at first minutely hairy, soon glabrous. *Seeds* osseous, rugose, not compressed, glabrous.

4. **A. ovata,** *Benth. in Gen. Pl.* ii. 1100; stem glandular-hirsute, leaves petioled ovate, spikes often panicled rather lax somewhat recurved, corolla $\frac{1}{3}$ in., anthers included not barbate, capsule hairy. Gymnostachyum ovatum, *T. Anders. ms.*; *Bedd. Ic. Pl. Ind. Or.* t. 250.

DECCAN PENINSULA; Myhendra Hills, Berhampore and Jeypur Hills (Vizagapatam), alt. 2–4000 ft., *Beddome.*

Stems 6–10 in., quadrangular, glandular-pubescent or subhirsute below. *Leaves* $2\frac{1}{2}$–3 by nearly 2 in., shortly attenuated into the petiole, sparsely hairy above, pubescent on the nerves beneath. *Racemes* axillary and terminal, 2–4 in. *Corolla* as of *A. elongata. Filaments* much dilated, thinly minutely hairy. *Capsule* $\frac{3}{4}$ by $\frac{1}{8}$ in., compressed. *Seeds* 8–10, subquadrate, osseous, rugose, glabrous, not compressed.—Perhaps a form only of *A. elongata,* Nees.

5. **A. tenuiflora,** *T. Anders. in Journ. Linn. Soc.* ix. 502; leaves ovate or lanceolate glabrous or pubescent on the nerves, spikes lax simple or compound, corolla $\frac{1}{3}$ in. obscurely 2-lipped, anthers included pubescent or slightly bearded, capsule pubescent ultimately glabrate. Haplanthus tener, *Nees in Wall. Pl. As. Rar.* iii. 115, and *Cat.* 7185, and in *DC. Prodr.* xi. 512. Gymnostachyum Parishii & andrographioides, *T. Anders. l. c.* 504.

EASTERN FRONTIER, alt. 500–3000 ft., from Assam to Tavoy, frequent. ANDAMANS; *Kurz.*—DISTRIB. Java, Borneo.

Stems 1–2 ft., quadrangular, pubescent, or glabrous unless at the very base. *Leaves* suddenly or cuneately narrowed at base; or the upper subsessile, base rounded or subcordate. *Pedicels* rarely $\frac{1}{10}$ in.—Perhaps not distinct from *A. ovata*: it presents three leading variations, viz. (a) *tenuiflora* type, T. Anders., leaves ovate, spikes long, flowers in remote clusters; (b) *Parishii,* T. Anders., leaves ovate, panicles lax glabrate, flowers mostly solitary; (c) *andrographioides,* T. Anders., leaves lanceolate.

VAR. *recedens*; nearly glabrous except the very lax compound closely glandular-pubescent panicle.—Tenasserim; Mooleeyit, alt. 2000 ft., *Beddome.*

6. **A. alata,** *Nees in DC. Prodr.* xi. 516; leaves petioled ovate upper

linear-oblong glabrous, panicle large lax branches 4-winged, sepals pubescent or subhirsute, capsule hairy. *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 502. Justicia alata, *Vahl Enum.* i. 139.

S. DECCAN PENINSULA, alt. 1–3000 ft.; Coimbatore, *Wight*, &c.; Nilgherries, *Gardner*. CEYLON; *Thwaites*.

Stems 2–4 ft., annual, erect, glabrous, 4-angular. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., somewhat suddenly attenuate into the petiole, conspicuously lineolate above; upper leaves few, distant, narrow. *Panicle* often 15 in. diam.; branches glabrous; pedicels 0–$\frac{1}{4}$ in., pubescent. *Sepals* $\frac{1}{6}$–$\frac{1}{5}$ in., bristle-pointed, pubescent or very hairy. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., hairy, white with pink spots; tube curved, limb obscurely 2-lipped. *Anthers* exserted; filaments subglabrous. *Capsule* 1 by $\frac{1}{5}$ in., compressed. *Seeds* osseous, glabrous, not compressed.—Perhaps only a variety of *A. elongata.* The panicle being large, the examples of the old collectors show only the panicle with the reduced narrow leaves belonging thereto; and the descriptions of Vahl, Nees and T. Anderson do not describe the proper cauline leaves.

7. **A. stenophylla,** *Clarke*; glabrous, cauline leaves linear, racemes lax, flowers nearly all pedicelled, capsule glabrous.

COIMBATORE; *Wight* (Herb. Propr. n. 2245).

Rootstock woody; annual stems from its crown numerous, erect and diffuse, quadrangular. *Leaves* 1–$1\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in.; raphides 0 or obscure. *Racemes* 2–5 in., axillary and terminal, not distinctly panicled, the upper leaves being nearly similar to the cauline; pedicels mostly nearly as long as the calyx. *Sepals* $\frac{1}{6}$ in., linear-lanceolate, glabrous or very nearly so. *Corolla* nearly as of *A. paniculata.* *Capsule* $\frac{2}{3}$ by $\frac{1}{6}$ in., compressed.

8. **A. Wightiana,** *Arn. ex Nees in DC. Prodr.* xi. 517; nearly glabrous, leaves subsessile lanceolate, racemes lax few-fld., pedicels sometimes as long as the calyx, corolla $\frac{2}{3}$ in. conspicuously 2-lipped, capsule glabrous. *Wight Ic.* t. 1558. A. gracilis, *Nees l. c.* 516; *T. Anders. in Journ. Linn. Soc.* ix. 503.—*Rheede Hort. Mal.* ix. t. 44.

S. DECCAN PENINSULA; Courtallum and Anamallay Forests, *Wight*; Mysore, *G. Thomson*; Mangalore, *Hohenacker*; Travancore and Tinnevelly Ghauts, *Beddome*.

Stems elongate, diffuse, lax, quadrangular, glabrous, or thinly obscurely glandular-hairy. *Leaves* attaining 3 by 1 in., subovate, base obtuse rarely cordate, glabrous minutely lineolate above rarely obscurely scabrid puberulous; petiole 0–$\frac{1}{10}$ in. *Racemes* 2–4 in., weak, glabrous or rarely minutely glandular-hairy; lower pedicels sometimes $\frac{1}{3}$ in. *Sepals* $\frac{1}{3}$ in., sublinear, lineolate, glabrous. *Corolla* purplish, spotted on the lower lip; lips $\frac{1}{3}$ in. *Anthers* exserted, slightly bearded at the base; filaments setulose. *Capsule* $\frac{3}{4}$–1 by $\frac{1}{8}$–$\frac{1}{6}$ in.—Authentic examples only differ from *A. gracilis* in the few thin glandular hairs scattered on the upper part of the stem and panicle. That Nees understood the same plant as Arnott and Wight is clear from his saying that in his *A. Wightiana* the calyx was glabrous.

9. **A. macrobotrys,** *Nees in DC. Prodr.* xi. 516; sparingly pubescent, leaves very short-petioled oblong-lanceolate, racemes elongate, sepals glandular-hairy, corolla $\frac{2}{3}$ in. conspicuously 2-lipped, capsule glabrous. A. Wightiana, *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 502, *not of Nees.*

MTS. of S. DECCAN PENINSULA; Mangalore, *Hohenacker*; Anamallays and Pulneys, *Beddome*. CEYLON; *Macrae*, &c.

Leaves 3 by $\frac{3}{4}$ in.; base cuneate or rhomboid, not rounded; nerves beneath often puberulous; petiole 0–$\frac{1}{5}$ in. *Racemes* 6–8 in. or more, glandular-hairy, often 1–2-branched. *Corolla* and *capsule* exactly as of *A. Wightiana.*—Very near *A. Wightiana*; but dries blacker, and has the leaves not widest at the base.

VAR. *parvifolia*; leaves 1–$1\frac{3}{4}$ in. A. ceylanica, *Nees l. c.* 518; *T. Anders. in Journ. Linn. Soc.* ix. 502, *not of Wight.*—Ceylon; *Walker*.

†† *Racemes dense, forming a viscous brown-hairy head or panicle.*

10. **A. viscosula,** *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC. Prodr.* xi. 517; leaves lanceolate glabrous densely lineolate above, corolla $\frac{2}{3}$ in. hairy. *Wight Ic.* t. 1559; *T. Anders. in Journ. Linn. Soc.* ix. 502. Justicia lineata, *Wall. Cat.* 2486, *letter b.*

S. DECCAN PENINSULA; Courtallum, *Wight* (Herb. Propr. n. 677); Pulney Hills, *Beddome.*

An undershrub, scarcely 1 foot; branches numerous, glabrous, 4-lineolate. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in., narrowed at both ends; petiole 0–$\frac{1}{3}$ in. *Panicles* 1–$2\frac{1}{2}$ in., terminal, many-fld., viscidly brown-hairy; pedicels 0–$\frac{1}{10}$ in.; bracts $\frac{1}{20}$ in., linear. *Sepals* $\frac{1}{5}$–$\frac{1}{6}$ in., linear-lanceolate. *Corolla* conspicuously 2-lipped; lips $\frac{1}{4}$–$\frac{1}{3}$ in. *Anthers* exserted, bases thinly bearded, filaments thinly bristly. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{8}$ in., pubescent. *Seeds* osseous, rugose, glabrous, not compressed.

VAR. *explicata*; leaves 3 by $\frac{3}{4}$–1 in., panicle elongate 6–8 in. less dense, capsules rather larger. A. ceylanica, *Wight Ic.* t. 1560, *not of Nees.*—Courtallum; *Wight* (Herb. Propr. nn. 676, 2242). Concan; *Stocks.* Anamallays and Nilgherries, *Beddome.*—Wight himself, after figuring his *A. ceylanica* from n. 676, has altered the name of a portion of his n. 676 to *A. viscosula.*

11. **A. Neesiana,** *Wight Ic.* t. 1561; leaves elliptic acute at both ends sparsely minutely hairy above glabrate beneath, racemes terminal subcapitate, sepals $\frac{1}{8}$ in., corolla $\frac{2}{3}$ in. hairy. *T. Anders. in Journ. Linn. Soc.* ix. 502, *excl. syn.*

PULNEY MTS.; *Wight* (Herb. Propr. n. 2705). WYNAAD; *Beddome.*

Branches elongate, undivided, glabrate, obscurely quadrangular. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in.; hairs remote many-cellular, raphides 0; petiole 0–$\frac{1}{4}$ in. *Racemes* forming a dense panicle 2–5 in. diam., viscidly brown-hairy. *Capsule* attaining 1 by $\frac{1}{3}$ in., compressed, minutely hairy.—Differs from *A. viscosula* in the absence of raphides from the leaves above.

VAR. *producta*; leaves elongate, heads produced into oblong sub-lax panicles. A. ceylanica, *Wight in Herb.* Andrographis sp. n. 13, *Herb. Ind. Or. H. f. & T.*—Shevagherry Hills; *Wight* (Herb. Propr. n. 2702). Tinnevelly; *Beddome.* Malabar; *Gibson* (in Herb. Dalzell), &c.—*Leaves* $4\frac{1}{2}$ by $\frac{1}{4}$ in., subsessile. *Panicles* 5 in., pyramidal. Texture, indumentum, &c., of the leaves exactly as in *A. Neesiana* type.

VAR. *affinis*, Nees in Wall. Pl. As. Rar. iii. 116, and in DC. Prodr. xi. 517 (sp.); leaves small elliptic or oblong pubescent, panicles pyramidal or oblong viscidly brown-pubescent, corolla $\frac{1}{2}$ in. *T. Anders. in DC. Prodr.* ix. 502.—Nilgherry and Kurg Mts., frequent; *Wight*, &c.—*Leaves* 1 by $\frac{1}{2}$ in., or smaller; minutely bristly above with no raphides, pubescent beneath; nerves less impressed on the upper surface, usually fulvous-pubescent. *Capsule* very hairy.

12. **A. stellulata,** *Clarke*; hairy, leaves short-petioled elliptic narrowed at both ends, heads terminal dense, sepals exceeding $\frac{1}{4}$ in. linear-setaceous, corolla $\frac{2}{3}$ in. A. Neesiana, *Benth. in Pl. Hohenack.* n. 1435, *not of Wight.*

NILGHERRY MTS., alt. 6000 ft., *Hohenacker*, &c.

Branches elongate, obscurely quadrangular, closely villous. *Leaves* $2\frac{1}{2}$ by 1 in., copiously sprinkled with fulvous multicellular hairs above, closely villous beneath; petiole 0–$\frac{1}{3}$ in. *Heads* 1–2 in. diam., viscidly brown-hairy. *Corolla* pale pink with purple spots on the lower lip. *Filaments* somewhat flattened, hairy upwards. *Capsule* $\frac{3}{4}$ by $\frac{1}{8}$ in. (and upwards), hairy, compressed. *Seeds* osseous, rugose, glabrous, not compressed.—Much resembling *A. Neesiana* and others of this subsection, but distinguished by the long substellate sepals.

13. **A. lineata,** *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC.*

Prodr. xi. 516; leaves subsessile ovate or broadly oblong shortly acute glabrous, panicles very compound viscidly grey- or dusky-pubescent, corolla $\frac{2}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 502.—Andrographis sp. n. 14, *Herb. Ind. Or. H. f. & T.* Justicia lineata, *Wall. Cat.* 2486, *letter a.*

S. DECCAN PENINSULA; Mysore and adjacent parts of the Nilghiri and Kurg Mts., *Wight, G. Thomson, Lobb*; Anamallays, *Beddome.*

Branches elongate, quadrangular, glabrous. *Leaves* $1\frac{3}{4}$ by 1 in., suddenly acute, base rounded; raphides above embedded, obscure; nerves beneath usually strongly elevated; petiole 0–$\frac{1}{12}$ in. *Panicle* 2–10 in.; pedicels 0 or very short. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., linear-lanceolate acute, glandular-hairy. *Corolla* hairy. *Anthers* bearded at the base. *Capsule* $\frac{3}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., thinly hairy.—Hardly separable from *A. viscosula* var. *explicata* by the less acuminate leaves with more strongly-marked nerves and the more densely bearded anthers.

VAR. *Lawii*; stem closely pubescent, leaves 3 in. sparsely pilose above pubescent beneath, panicle large open.—Bababoodun Hills; *Law.* Nundidroog, *Beddome.*—Referred to *A. affinis* in Herb. Hooker: the large strongly lineate leaves, large panicle and densely barbate anthers bring it nearer to *A. lineata* type.

14. **A. lobelioides,** *Wight Ill.* t. 164 b, fig. 11, and *Ic.* t. 1557; leaves small sessile ovate pubescent or glabrous, racemes in a subterminal panicle, corolla $\frac{1}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 503. Justicia lobelioides, *Wall. Cat.* 2484. Erianthera lobelioides, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 514.

NILGHIRI MTS., alt. 6–8000 ft., common in the open grass, *Wight*, &c.

Very rusty pubescent or nearly glabrous. *Rootstock* woody; stems 2–8 in., very numerous, procumbent. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. diam. *Panicles* 1–4 in.; lower pedicels $\frac{1}{10}$–$\frac{1}{4}$ in. *Sepals* $\frac{1}{5}$ in. *Anthers* much exserted, conspicuously white-barbate. *Capsule* $\frac{2}{3}$ by $\frac{1}{8}$ in.—Very variable in indumentum. Easily distinguished (without the fruit) from *A. serpyllifolia* by the absence of flowers in the lower axils.

VAR. *composita*; racemes elongate compound forming a terminal quasi-panicle 12 by 8 in.—Courtallum Hills and Tinnevelly; *Beddome.*

** *Capsule elliptic,* 2–3 *times as long as broad.*

15. **A. echioides,** *Nees in Wall. Pl. As. Rar.* iii. 117, and in *DC. Prodr.* xi. 518; erect, hairy, leaves sessile oblong or subelliptic obtuse, racemes numerous axillary, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. *Wight Ic.* t. 467; *Dalz. & Gibs. Bomb. Fl.* 198; *T. Anders. in Journ. Linn. Soc.* ix. 503. Justicia echioides, *Linn.*; *Burm. Fl. Ind.* 9; *Roxb. Fl. Ind.* i. 118; *Wall. Cat.* 2439.—*Rheede Hort. Mal.* ix. t. 46.

TROPICAL INDIA, in the drier districts from the Punjab and Chota Nagpore to Ceylon, common (absent in Bengal proper and humid Malabaria).

Annual, 8–24 in., closely pubescent and with patent white hairs. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate. *Racemes* about as long as the leaves, divaricate or recurved, often one from each axil about the middle of the stem; pedicels very short. *Sepals* $\frac{1}{6}$–$\frac{1}{4}$ in., linear; in fruit elongated, sometimes $\frac{1}{2}$ in. *Corolla* pubescent, pink or white, lower lip dark-purple. *Anthers* much exserted, white-barbate. *Capsule* $\frac{1}{3}$ by $\frac{1}{6}$ in., acute at both ends, hairy. *Seeds* twice as long as broad, osseous, rugose, glabrous, not compressed.

16. **A. glandulosa,** *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 518; hairy, leaves petioled oblong or subelliptic obtuse, racemes numerous axillary, lower pedicels nearly as long as the calyx. Justicia glandulosa, *Wall. Cat.* 2485.

MYSORE; *Heyne* (fide Nees), *Wight* (Herb. Prop. n. 2026).

Leaves 1 by $\frac{1}{3}$ in., both in Wight's and Wallich's examples, on which Nees

founds his species; which both hardly differ from *A. echioides* but by their short-petioled (not sessile) leaves and rather shorter ($\frac{1}{6}$ in.) sepals.—This is certainly *A. glandulosa*, Nees, for he has written his name on Wight's n. 2026, though this appears to be an erect annual.

17. **A. Rothii,** *Clarke*; shrubby, hairy, leaves small shortly petioled ovate or orbicular, racemes axillary lax few-fld., lower pedicels nearly as long as the calyx. Justicia glandulosa, *Roth Nov. Sp.* 13? ; *not of Wall.*

S. DECCAN PENINSULA; *Wight* (Herb. Propr. n. 675).

Rootstock woody; branches 8–12 in., wavy, closely pubescent, and with white patent hairs, some glandular. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., base rounded or in a few of the lower very shortly attenuated; petiole 0–$\frac{1}{8}$ in. *Racemes* 2–4 in., patent or recurved, wavy, sometimes bifid, upper subpanicled; bracts $\frac{1}{8}$ in., ovate. *Sepals* $\frac{1}{6}$–$\frac{1}{5}$ in. *Capsule* $\frac{1}{3}$ by $\frac{1}{8}$ in., subobtuse.—Found loose in Wight's Herbarium, marked simply *Erianthera*: it appears to fit very closely Roth's description of his *Justicia glandulosa*.

18. **A. serpyllifolia,** *Wight Ic.* t. 517; stems procumbent villous, leaves small sessile orbicular, racemes many 1- or few-fld. in the lower axils. *T. Anders. in Journ. Linn. Soc.* ix. 503. Justicia serpyllifolia, *Vahl Enum.* i. 169. J. nummularifolia, *Wall. Cat.* 2461. Erianthera serpyllifolia, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 514.

S. DECCAN PENINSULA; Mysore, Palamcotta, &c., *Shuter, Wight*, &c.

Rootstock woody; annual stems 2–12 in., closely procumbent, curved, densely leafy. *Leaves* $\frac{1}{2}$ in. diam., obtuse, more or less hairy. *Racemes* sometimes forming a small terminal quasi-panicle, but always with many 1–2-fld. in the lower axils; bracts $\frac{1}{10}$–$\frac{1}{6}$ in., orbicular, being gradually reduced leaves. *Sepals* $\frac{1}{6}$–$\frac{1}{4}$ in., linear; in fruit often $\frac{1}{3}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in.

19. **A. Beddomei,** *Clarke*; leaves short-petioled elliptic and obovate glabrous, racemes solitary axillary small few-fld., lower pedicels viscous-pubescent, corolla $\frac{1}{2}$–$\frac{2}{3}$ in. conspicuously 2-lipped, anthers exserted bases densely white-bearded.

MADRAS; Kurnool, Nallaymallays, alt. 2000 ft., *Beddome*.

Stems 4–6 in., subsimple, quadrangular. *Leaves* 3½ by 1½–2 in., subobtuse, somewhat coriaceous, base cuneate, raphides 0 or obscure; petiole 0–$\frac{1}{6}$ in. *Racemes* $\frac{3}{4}$ in., 3–5-fld., viscous-pubescent; bracts $\frac{1}{8}$ in., oblong, subobtuse. *Calyx* $\frac{1}{4}$ in. *Corolla* and *stamens* nearly as of *A. echioides*. *Capsule* not seen.

XXIX. HAPLANTHUS, *Nees*.

Erect herbs. *Leaves* petioled, ovate, entire. *Flowers* axillary, appearing whorled, whorls sometimes approximated into terminal spikes, surrounded by numerous barren branchlets, reduced to acicular cladodes terminated by 2–3 minute spines; proper bracts and bracteoles small. *Calyx* small; sepals sublinear. *Corolla* smallish, tubular; limb 2-lipped; lobes imbricated. *Stamens* 2; anthers 2-celled; cells ovate, equal or one sometimes much smaller, muticous; connective very hairy behind. *Ovary* 6–16-ovulate; style shortly bifid at the tip. *Capsule* narrowly oblong acute, 6–16-seeded from the base. *Seeds* ellipsoid, somewhat compressed, densely shortly hairy when moistened.—Species 3, endemic in India.

1. **H. verticillaris,** *Nees in DC. Prodr.* ix. 513; cladodes in fruit stout rigid pubescent scarcely ciliate towards the tips, calyx minutely pubescent or glabrate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 504. Justicia verticillata, *Roxb. Fl. Ind.* i. 135.

W. DECCAN PENINSULA, frequent, *Roxburgh*, &c., extending north to Mt. Aboo, *Stocks*.

Stems 2–3 ft., pubescent or nearly glabrous. *Leaves* 3½ by 2 in., shortly acuminate, base suddenly attenuated, pubescent or nearly glabrous; petiole 1 in. *Cladodes* often 1–1½ in. in fruit, pubescent or glabrous, with or without scattered patent bristles in their lower half. *Calyx* ⅙ in., glabrous or puberulous. *Corolla* ⅜ in., pale lilac. *Calyx* ½ in. and upwards, glabrous.

2. **H. tentaculatus,** *Nees in DC. Prodr.* xi. 513; cladodes in fruit slender curved glabrous or pubescent not ciliate, calyx pubescent scarcely ciliate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 503. Ruellia tentaculata, *Linn. Amœn. Acad.* iv. 320; *Burm. Fl. Ind.* 134, t. 40, fig. 1. R. aciculata, *Roth Nov. Sp.* 301.

BOMBAY; *Dalzell*. BELGAUM; *Ritchie*. MALABAR; Yelwah Hill in Palghaut, *Beddome*. CENTRAL INDIA; Mandoo, *Edgeworth*.

Cladodes in fruit ½ in. *Corolla* less than ½ in., white (Ritchie). *Capsule* ¼–⅓ in., glabrous; seeds much smaller than in *H. verticillaris*.—Very near *H. verticillaris*. Dalzell says l. c. that *H. tentaculatus* is a much stouter species than *H. verticillaris*; but his numerous examples submitted are named by him in accordance with Nees' naming.

VAR. *nilgherrensis*; whorls collected mostly in terminal spikes, cladodes and sepals with many patent needle-like white hairs. H. nilgherrensis, *Wight Ic.* t. 1556. —Mts. of Nilghiri and Kurg, frequent; *Wight, Hohenacker*, &c.

VAR. *plumosa*; calyx densely hispid-hairy subplumose. H. plumosa, *T. Anders. in Journ. Linn. Soc.* ix. 504. Haplanthus sp. n. 4, *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks*. Belgaum; *Ritchie*.

3. **H.? hygrophiloides,** *T. Anders. in Journ. Linn. Soc.* ix. 503; leaves petioled ovate acute tomentose on both surfaces, flowers axillary aggregated, bracts minute linear.

PEGU; *Brandis* (fide T. Anderson).

An insignificant weed; stems 4-angular furfuraceous. *Leaves* 1–1¼ by ½–1 in., minutely lineolate. *Sepals* ¼ in., subulate. *Corolla* small, pubescent. *Stamens* 2; anthers 2-celled, one cell bearded. *Capsule* linear, compressed, glandular, many-seeded.—No example seen; the foregoing copied from T. Anderson.

XXX. **GYMNOSTACHYUM,** *Nees*.

Herbs or undershrubs. *Leaves* cauline or subradical, entire, sinuate crenulate or toothed. *Cymes* axillary or in a terminal panicle, often spicate or racemose, sometimes small axillary; bracts and bracteoles very small, except in *G. hirsutum*; flowers subsessile or shortly pedicelled. *Calyx* small (except in *G. hirsutum*), sub-5-partite; segments equal, linear-lanceolate. *Corolla-tube* slender, cylindric; limb small, 2-lipped; lobes 5, subequal, quadrate-elliptic, imbricate. *Stamens* 2, nearly as long as the corolla; filaments usually hairy at least near the base; anthers 2-celled; cells subequal, oblong or ovate, hairy or glabrous. *Ovary* pubescent, many-ovulate; style subentire at the tip. *Capsule* linear, pubescent or nearly glabrate, 16–24-seeded. *Seeds* ovoid, compressed, hairy, hairs very shortly spreading when moistened.—Species 15, Indian, with a few Malayan.

* Panicle terminal, leafless or nearly so.

† *Leaves mostly near the base of the stem.*

1. **G. venustum,** *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves large

ovate, panicle large pubescent, corolla $\frac{3}{4}$–1 in. slender. Justicia venusta, *Wall. Cat.* 2470, and *Pl. As. Rar.* i. 53, t. 66; *Bot. Reg.* t. 1380. Cryptophragmium venustum, *Nees in Wall. Pl. As. Rar.* iii. 180, and in *DC. Prodr.* xi. 94; *Bot. Mag.* t. 3208.

KHASIA MTS., alt. 0–4000 ft., common on the southern face, *Wallich.*, *H.f. & T.*, &c.

Attaining 1–4 ft.; stem leafless or with few remote very small leaves. Radical *leaves* 6 by 3–4 in., or larger, acute, decurrent on the petiole, entire or undulate-crenate, nearly glabrous, or with scattered minute hairs above, nerves beneath pubescent; petiole 0–4 in. *Panicle* sometimes 8 by 12 in., or reduced to a single spike; flowers opposite, 1–3 together; bracts small, linear; bracteoles 0. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., linear, hairy. *Corolla* pubescent; limb deep purple or blueish. *Anthers* oblong, glabrous. *Capsule* $\frac{3}{4}$ in.

2. **G. febrifugum,** *Benth. in Flora* 1849, 558; leaves ovate, panicle puberulous, corolla $1\frac{1}{4}$ in. upper half inflated, capsule 1 in. G. alatum, *Wight Ic.* t. 1525; *T. Anders. in Journ. Linn. Soc.* ix. 506.

S. DECCAN PENINSULA; Mangalore, *Hohenacker* (n. 374), *Wight.*

Nearly stemless. *Leaves* $6\frac{1}{2}$ by 3 in., decurrent on the petiole, subentire or undulate-crenulate, above lineolate nearly glabrous or minutely sparsely setulose, beneath paler glabrous or pubescent on the nerves. *Panicles* 6–12 in., in appearance radical; flowers opposite, solitary or in very small few-fld. cymes; bracts small, narrow; bracteoles 0. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., glabrous or puberulous. *Corolla* glabrous. *Anthers* ovate, hairy.—Hohenacker observes that "a decoction of the root is a febrifuge," and Bentham's name *febrifugum* has one year's priority over *alatum.*

3. **G. ceylanicum,** *Arn. & Nees in DC. Prodr.* xi. 93; leaves elliptic glabrate lineolate above, panicles linear pubescent, corolla $\frac{3}{4}$ in. *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 506; *Bedd. Ic. Pl. Ind. Or.* t. 265.

CEYLON; *Walker, Thwaites,* &c.

Stem 1–3 in., villous. *Leaves* 3 by $1\frac{1}{4}$ in., obtuse, base acuminate, undulate-crenate, pubescent beneath especially on the nerves; petiole $1\frac{1}{2}$ in. *Peduncles* 1–6 in.; panicles 5–9 by $\frac{3}{4}$ in.; cymes small, subfascicled; bracts $\frac{1}{8}$ in., linear. *Sepals* $\frac{1}{6}$ in., linear-lanceolate, grey-pubescent. *Corolla* nearly glabrous; tube narrow purplish; limb small greenish-yellow. *Anthers* subquadrate, glabrous. *Capsule* $\frac{3}{4}$ in.

4. **G. Thwaitesii,** *T. Anders. in Thwaites Enum.* 232; leaves elliptic hairy on both surfaces, panicles oblong pubescent, corolla $\frac{1}{2}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 255.

CEYLON; Ambagamowa District, *Thwaites.*

Leaves above with many lax multicellular hairs. *Panicle* open; lateral cymes $\frac{1}{2}$–$1\frac{1}{2}$ in. Otherwise as *G. ceylanicum.*

5. **G. polyanthum,** *Wight Ic.* t. 1494; leaves broadly ovate subglabrate base rounded or cordate, panicles linear glabrous or nearly so, corolla $\frac{2}{3}$ in.

COORG; *Jerdon,* in Herb. Wight.

Stem 1 in., grey-puberulous. *Leaves* $2\frac{1}{2}$ in. diam., shortly acute or subobtuse, nearly entire, punctulate above; nerves beneath much raised, grey-puberulous; petiole $1\frac{3}{4}$ in. *Panicles* 8 by $\frac{3}{4}$ in.; flowers in subcapitate cymes; bracts minute, linear. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., linear-lanceolate, glabrous or obscurely puberulous. *Corolla* puberulous, pink (in the dried example). *Capsule* $\frac{2}{3}$ in.—Overlooked by T. Anderson.

†† *Stems elongate, leafy upwards.*

6. **G. paniculatum,** *T. Anders. in Thwaites Enum.* 232; leaves ovate

or elliptic acute at both ends pubescent at least on the nerves beneath, panicle subterminal pubescent branches cymose, corolla ⅜ in. *Bedd. Ic. Pl. Ind. Or.* t. 252.

CEYLON, alt. 1–2000 ft.; *Walker, Thwaites.*

Erect, 2–3 ft., hairy, leafy to the panicle. *Leaves* 5 by 2 in., undulate, lineolate, glabrate or hairy above; petiole ½ in. *Panicles* 7 by 3 in., sometimes somewhat leafy at the base; lateral branches repeatedly closely 2–3-chotomous; bracts ⅛–⅙ in., linear; pedicels 0–⅛ in., often distinct. *Sepals* ⅙ in., linear-lanceolate, pubescent. *Corolla* pubescent. *Anthers* ovate, glabrous. *Capsule* ⅜ in.

7. **G. glabrum,** *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves ovate or elliptic acuminate at both ends undulate-crenate pubescent on the nerves beneath, panicle terminal villous, flowers fascicled on the spikes, corolla ⅜ in. *Bedd. Ic. Pl. Ind. Or.* t. 251. Cryptophragmium glabrum, *Dalz. in Hook. Kew Journ.* ii. 338; *Dalz. & Gibs. Bomb. Fl.* 185.

CONCAN; *Law, Dalzell.*

An undershrub (Beddome); stems nearly glabrous. *Leaves* 7 by 2¾ in., puberulous on both surfaces or glabrate; petiole ¾ in. *Flowers* sessile, clustered; bracts ⅕ in., linear-lanceolate. *Sepals* ⅙ in., sublinear, villous, often viscid glandular. *Corolla* minutely pubescent, white purple-spotted in the throat. *Anthers* ovate, glabrous. *Capsule* ¾ in.

VAR. *denticulata*; leaves distinctly toothed glabrous even when young.—Concan Ghauts; *Dalzell, Ritchie.*

8. **G. leptostachyum,** *Nees in Wall. Pl. As. Rar.* iii. 106, and *Cat.* 7178, and in *DC. Prodr.* xi. 93; leaves elliptic acuminate at both ends slightly pubescent, panicle reduced to 1 or 2 long-linear spikes hairy, corolla ⅜ in.

TAVOY; *Wallich.*

Stems creeping, rooting; annual flowering branches 3–5 in., erect, simple, villous. *Leaves* 4½ by 1½ in., subentire, upper surface with distant multicellular lax hairs, lower pubescent on the nerves; petiole ½ in. *Spikes* 1 or 2 terminal, 3–10 in.; flowers solitary, distant; bracts ⅛ in., linear-lanceolate. *Sepals* ⅙ in., linear-lanceolate, pubescent. *Corolla* narrow, straight. *Capsule* ½ in., very slender, 20-seeded.—Overlooked by T. Anderson.

** Inflorescence axillary, a terminal panicle sometimes added.

9. **G. canescens,** *T. Anders. in Journ. Linn. Soc.* ix. 505; leaves ovate acuminate at both ends pubescent on both surfaces, panicles axillary and terminal pubescent or villous, corolla ⅜ in. G. serrulatum, *T. Anders. l. c.*; *Bedd. Ic. Pl. Ind. Or.* t. 254. Cryptophragmium canescens, *Nees in Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 95; *Wight Ic.* t. 1495. C. serrulatum, *Nees ll. c.* Justicia serrulata, *Wall. Cat.* 2452.

W. DECCAN PENINSULA, from Bombay to Courtallum, *Wight*; Tinnevelly, *Beddome.*

Apparently a shrub. *Branches* pubescent or villous. *Leaves* 8 by 3¾ in., undulate or minutely toothed; petiole 1½ in. *Panicles* trichotomous; bracts ⅛ in., lanceolate; pedicels hardly any. *Sepals* ⅛–¼ in., linear-lanceolate, minutely pubescent. *Corolla* pubescent. *Anthers* ovate, puberulous. *Capsule* ½ in.—Nees made 2 species out of Wallich's 4 branches; and it is not clear why T. Anderson kept them up, unless he meant to transfer Nees' name *serrulatum* to the following var.

VAR. *longifolia*; leaves 9 by 1¾ in. elongate lanceolate distinctly toothed. G. longifolia, *T. Anders. ms.*—Canara Ghauts; *Law.*

10. **G. latifolium,** *T. Anders. in Journ. Linn. Soc.* ix. 505; glabrous,

leaves large long-petioled ovate, panicles mostly lateral many-fld., corolla 1 in. *Bedd. Ic. Pl. Ind. Or.* t. 253. Cryptophragmium latifolium, *Dalz. in Hook. Kew Journ.* ii. 137; *Dalz. & Gibs. Bomb. Fl.* 185. Phlogacanthus latifolius, *Wight Ic.* t. 1537; *T. Anders. in Journ. Linn. Soc.* ix. 508.

CONCAN, CANARA, and MALABAR, *Dalzell, Wight,* &c.; Bababoodun Hills, *Wight.*

An undershrub, 3 ft. (*Dalzell*). *Leaves* attaining 9 by 5¾ in., acute, very shortly acuminate into the petiole, subentire; petiole often 6 in. *Panicles* chiefly from the axils of fallen leaves, 3–5 in.; branches subspicate; flowers solitary or clustered; bracts small, linear. *Sepals* ⅙ in., linear. *Corolla* puberulous; limb greenish-yellow. *Anthers* ovate, minutely hairy. *Capsule* ¾ in., very narrow, glabrate, 24-seeded. *Seeds* ovoid, compressed, hairy.

11. **G. sanguinolentum,** *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 506; leaves elliptic narrowed at both ends nearly glabrous, cymes small axillary short-peduncled few-fld. subglobose somewhat pubescent, corolla ¾ in. Justicia sanguinolenta, *Vahl Symb.* ii. 10. Cryptophragmium sanguinolentum, *Nees in DC. Prodr.* xi. 96. C. axillare, *Nees l. c.*; *Wight Ic.* t. 1496.

CEYLON; *Champion, Walker,* &c.

Diffuse; branches nearly glabrous. *Leaves* 4 by 1½ in., entire undulate or irregularly subdentate, punctate or minutely lineolate above sometimes obscurely scaberulous; petiole ¼–½ in. *Peduncles* ⅛–½ in., nearly glabrous; cymes ½–1 in. diam.; bracts ⅛ in., linear; pedicels 0–⅛ in. *Sepals* ⅛ in., linear, puberulous. *Corolla* pubescent. *Capsule* ¾ in.

12. **G. tomentosum,** *T. Anders. in Journ. Linn. Soc.* ix. 505; glandular-tomentose, leaves ovate hirsute on both surfaces, spikes axillary and terminal trichotomous, corolla ½ in. subcylindric pubescent.

CENTRAL INDIA; *Beddome* (fide T. Anderson).

A perennial, erect herb, 1–2 ft. Upper *leaves* 1 by ¾ in., sessile, base attenuated, undulate, whitened beneath. *Spikes* dense; flowers pedicelled; bracts ⅓ in., linear, glandular ciliate. *Sepals* ½ in., aristate ciliate. *Stamens* included; anther-cells equal. *Capsule* 1 in., linear, many-seeded; retinacula erect, acute (*T. Anderson*).—Not seen, genus very doubtful.

13. **G. hirsutum,** *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 505; leaves broadly elliptic acute or ovate acute at both ends hairy on both surfaces, spikes axillary and terminal dense cylindric hirsute, bracteoles ½ in. linear, corolla ¾ in. *Bedd. Ic. Pl. Ind. Or.* t. 249.

CEYLON; *Thwaites.*

Erect, 2–3 ft., glabrous except at the tip. *Leaves* 8 by 3½ in., entire or undulate; petiole 2 in. *Spikes* 1–4 by 1 in., quasi-peduncled, sometimes panicled, resembling those of the dense-fld. species of *Ebermaiera*. *Sepals* ⅙ in., linear, hirsute. *Corolla, stamens* and *pistil* as of *Gymnostachyum* (fide *Beddome*). *Capsule* ¾ in., many-seeded.

XXXI. PHLOGACANTHUS, *Nees.*

Shrubs or tall herbs. *Leaves* entire, or obscurely crenate. *Flowers* orange red or pink; thyrses or narrow panicles terminal, rarely racemes or cymes axillary; bracts small, bracteoles 0. *Calyx* deeply 5-fid; segments very narrow. *Corolla* tubular, curved upwards; limb on one side or (not very deeply) 2-lipped; segments ovate or oblong, connivent patent or recurved, imbricate in bud. *Stamens* 2, sometimes 2 small rudiments added;

anthers 2-celled, oblong, muticous, glabrous. *Ovary* usually glabrous, 10–16-ovulate; style filiform, subsimple at the tip. *Capsule* elongate, subtetragonous, many-seeded from the base. *Seeds* lenticular, ovate in outline, glabrous or densely shortly hairy.—Species 11, endemic in India.

This genus differs from *Gymnostachyum* in the broader, curved corolla, the glabrous ovary, and the much stouter capsule. The 2 following genera *Cystacanthus* and *Diotacanthus* are with difficulty discerned by the form of the corolla.

* *Thyrses or dense panicles terminal.*

1. **P. curviflorus,** *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 320; leaves large elliptic or obovate nearly glabrous, thyrse dense closely villous, calyx-teeth $\frac{1}{3}$ in., corolla $1\frac{3}{4}$ in. tubular curved scarcely widened upwards. *Bot. Mag.* t. 3783; *T. Anders. in Journ. Linn. Soc.* ix. 506; *Kurz For. Fl.* ii. 246. Justicia curviflora, *Wall. Cat.* 2429, and *Pl. As. Rar.* ii. 9, t. 112.

KHASIA MTS., alt. 0–4000 ft.; frequent on the southern face, *Wallich*, &c.

Stem 3–6 ft., stout, glabrous, puberulous upwards. Uppermost *leaves* often 12 by 4–5 in., acuminate at both ends, subentire, punctulate on both surfaces, nerves beneath sometimes puberulous; petiole $2\frac{1}{2}$ in. *Thyrse* 4–8 in., short-peduncled; bracts $\frac{1}{8}$ in., linear. *Calyx-tube* $\frac{1}{8}$ in.; teeth sublinear, closely villous. *Corolla* densely villous, brick-red or orange; limb small, lobes hardly patent. *Stamens* glabrous, 2 small rudiments present. *Style* thinly hairy. *Capsule* $1\frac{1}{2}$ by $\frac{1}{4}$ in., glabrous, 12–14-seeded. *Seeds* $\frac{1}{8}$ in. diam., much compressed, glabrous.—Wallich says the flowers are bright orange-red; it is generally a brick-red obscurely orange; it is not known wild of the colour depicted by Wallich, or in Bot. Mag.

VAR. *brevicalyx*; calyx-teeth scarcely $\frac{1}{8}$ in.—Pegu; *Kurz*. Moulmein; *Parish*. Tenasserim; *Beddome*.—A shrub, 15 ft. (*Beddome*). *Thyrse* much less densely villous than in *P. curviflorus* type. *Sepals* without sometimes nearly-glabrous, much shorter than in *P. curviflorus* type. *Flowers* greenish-yellow (*Parish*).—T. Anderson is mistaken in supposing that this variety is cultivated in Lower Burma, and not wild.

2. **P. Wallichii,** *Clarke*; leaves large elliptic acuminate at both ends glabrous, thryse dense closely villous, calyx-teeth $\frac{1}{8}$ in., corolla $\frac{3}{4}$ in. tubular curved scarcely widened upwards. P. asperulus, *Wall. Cat.* 7171 *partly, not of Nees.* Loxanthus Gomezii, *Nees in Wall. Cat.* 7170, and in *Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 322, *partly*.

KHASIA MTS.; *Gomez*. JAINTEA HILLS; Jarain, alt. 3000 ft., *Clarke*.

Leaves $10\frac{1}{2}$ by $3\frac{1}{4}$ in., subentire; petiole 1 in. *Thyrse* 2–4 in., short-peduncled; bracts $\frac{1}{8}$ in., linear. *Calyx-tube* $\frac{1}{16}$ in., teeth linear-lanceolate villous. *Corolla* densely villous, red; limb small, lobes subequal, scarcely patent. *Stamens* and *style* glabrous.—Resembling *P. curviflorus*, but with a smaller thyrse, and very much smaller corolla.

3. **P. tubiflorus,** *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large elliptic or ovate narrowed at both ends softly pubescent beneath, panicles elongate dense somewhat pubescent, calyx-teeth $\frac{1}{8}$ in., corolla $\frac{3}{4}$ in. tubular curved scarcely widened upwards. *T. Anders. in Journ. Linn. Soc.* ix. 506, *partly*. Justicia tubiflora, *Wall. Cat.* 2428.

ASSAM PLAINS; *Hamilton, Jenkins, Masters*: and adjacent KHASIA TERAI, alt. 2000 ft.; Borpani, *H.f. & T.*

Leaves attaining 10 by 3–$5\frac{1}{2}$ in., subentire or crenulate, densely punctulate above, almost woolly (but deciduously) pubescent beneath; petiole 1–2 in., pubescent. *Panicle* 2–8 in., densely closely ramous, subthyrsoid; pedicels often $\frac{1}{4}$ in.; bracts $\frac{1}{3}$ in., linear. *Calyx-tube* $\frac{1}{16}$ in.; teeth linear-lanceolate, pubescent or glabrate. *Corolla* nearly as of *P. Wallichii*, yellow-red (Nees). *Capsule* $1\frac{1}{3}$ by $\frac{1}{3}$ in., glabrous,

12-seeded. *Seeds* much compressed, glabrous.—Nearly allied to *P. Wallichii*, differing in the softly hairy under surface of the leaves and the much more open panicle.

4. **P. parviflorus,** *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves large broadly lanceolate glabrous, panicle terminal linear nearly glabrous, sepals ⅛ in., corolla 1 in. narrowly tubular curved.

S.E. ASSAM; Namyoon in the Patkoye Mts., *Griffith* (Kew Distrib. n. 6154, n. 6155 *partly*).

A shrub similar in habit to *P. Wallichii*. *Leaves* 9 by 2½ in., acuminate at both ends, subentire, obscurely puberulous above, paler and glabrous beneath; petiole 1 in. *Panicles* 4 by ¾ in., subsessile; pedicels 0–⅙ in. *Calyx-tube* scarcely $\frac{1}{20}$ in.; teeth linear-lanceolate, nearly glabrous. *Corolla* very slightly pubescent, blood-red, miniate (*Griffith*); lobes small, scarcely patent. *Capsule* not seen.—Griffith's original ticket remains on the example authenticated by T. Anderson, and shows that the plant was not collected in Mishmee.

5. **P. thyrsiflorus,** *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large lanceolate glabrous, thyrses elongate dense villous, calyx-teeth ¼–⅓ in., corolla ¾ in. wide-tubular 2-lipped. *T. Anders. in Journ. Linn. Soc.* ix. 506; *Kurz For. Fl.* ii. 246. Justicia thyrsiflora, *Roxb. Fl. Ind.* i. 114; *Wall. Cat.* 2430.

SUBTROPICAL HIMALAYA, alt. 0–4000 ft., from Gurwhal to Bhotan, very common. KHASIA MTS. and ASSAM, alt. 0–3000 ft., common. MOULMEIN; *Parish*.—DISTRIB. Ava.

A shrub, 3–7 ft. *Leaves* 7 by 1¾ in., tapering at both ends, subentire, densely punctulate; petiole ¾ in. *Thyrses* 4–12 in., terminal, solitary or several, or quasi-axillary on lateral branches; peduncles short; bracts ¼ in., linear. *Calyx-tube* ⅛ in.; teeth setaceous, densely pubescent. *Corolla* closely villous, orange; tube broad from the base, curved; upper lip suberect, lower patent. *Stamens* glabrous, or slightly hairy near the base of the filaments; 2 rudiments often discernible. *Style* glabrous. *Capsule* 1¼ by ⅙ in., subquadrangular, glabrous, 12–14-seeded. *Seeds* much compressed, orbicular in outline, densely shortly hairy, hairs elastically spreading when moistened.

6. **P. asperulus,** *Nees in Wall. Pl. As. Rar.* iii. 99, and *Cat.* 7171, and in *DC. Prodr.* xi. 321, *excl. some syn.*; leaves elliptic acuminate at both ends glabrous, panicles linear subthyrsoid somewhat pubescent, calyx-teeth ⅙ in., corolla ⅓–½ in. tube cylindric limb much inflated ovoid. P. vitellinus, *T. Anders. in Journ. Linn. Soc.* ix. 507, *excl. some syn.*; *Kurz For. Fl.* ii. 246. Justicia vitellina, *Roxb. Fl. Ind.* i. 115, and *Ic. Ined. in Herb. Kew.* J. quadrangularis, *Wall. Cat.* 2451; *Bot. Mag.* t. 2845. J. asperula, *Lodd. Bot. Cab.* t. 1681, *not of Wall.* J. guttata, *Wall. Cat.* 2431, *by mixture.* Endopogon vitellinus, *Nees in DC. Prodr.* xi. 723.

KHASIA MTS. and ASSAM; *Wallich*, *Simons*. CHITTAGONG HILLS; *Roxburgh*, *Clarke*.

A shrub, 3 ft., nearly glabrous. *Leaves* 5 by 2 in., undulate, scarcely puberulous or punctate; petiole ⅔ in. *Panicle* 2–4 in., terminal, usually solitary, very narrow; bracts ⅙ in., linear. *Calyx-tube* $\frac{1}{16}$ in.; teeth setaceous, puberulous. *Corolla* suddenly curved and inflated at the summit of the tube, pubescent, pink-purple often yellow-marked; limb ringent (Roxburgh), segments connivent or not widely patent. *Capsule* ⅔ by ⅙ in., glabrous. *Seeds* glabrous.—This is one of the many species which Nees named *Thyrsacanthus indicus*.

7. **P. guttatus,** *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large oblong or elliptic acuminate at both ends glabrous, panicles linear dense somewhat pubescent, calyx-teeth ⅛ in., corolla ⅔–¾ in. 2-lipped, segments oblong patent subrecurved. *T. Anders. in Journ.*

Linn. Soc. ix. 507. Justicia guttata, *Wall. Cat.* 2431 *chiefly*, and *Pl. As. Rar.* i. 24, t. 28; *Bot. Reg.* t. 1334.

KHASIA MTS., alt. 2–4000 ft.; on the southern face common, *Wallich*, &c. BHOTAN (*T. Anderson*).

Leaves often 9 by 3 in.; petiole 1¼ in. *Panicles* 3–6 by 1 in., terminal or quasi-terminal, solitary or 2–3 together. *Corolla* pubescent; upper lip suberect, shortly 2-lobed, yellow; lower deeply 3-lobed, segments patent subrecurved, green with purple spots. *Capsule* 1¼ by ⅓ in., 12-seeded.—Confused with *P. asperulus*, but the leaves are larger, the corolla larger and altogether a different shape and colour. Nees doubts whether Bot. Reg. t. 1334 belongs here, but it is a most faithful picture.

8. **P. elongatus,** *T. Anders. in Journ. Linn. Soc.* ix. 508; leaves long-petioled ovate acuminate at both ends glabrous, spikes elongate slender, corolla ½ in. tubular 2-lipped. *Kurz For. Fl.* ii. 246.

TENASSERIM; Amherst, *Falconer (T. Anderson)*.

An undershrub, 1–2 ft.; stem terete, primrose. *Leaves* including the petiole 4-6 by 2¼ in. *Spikes* nearly a foot, most terminal trichotomously branched or axillary simple; flowers distichously opposite, sessile, solitary; bracts ⅛ in., ovate, acute; bracteoles subulate. *Calyx* deeply 5-partite, segments linear. *Corolla-tube* straight, pubescent, lower lip hirsute within. *Stamens* of the genus. *Capsule* ⅜ in., clavate, subtetragonous, glabrous, 8-seeded (*T. Anderson*).—Not seen.

** *Cymes or short panicles axillary.*

9. **P. pubinervius,** *T. Anders. in Journ. Linn. Soc.* ix. 508; leaves elliptic or ovate acute at both ends pubescent on the nerves beneath, cymes axillary, calyx-segments woolly within nearly glabrous on the back. —Phlogacanthus sp. n. 7, *Herb. Ind. Or. H.f. & T.*

SIKKIM, alt. 5–7000 ft., *J. D. H.* BHOTAN; *Griffith*. ASSAM and KHASIA MTS., alt. 3–5000 ft., frequent, *Griffith*, &c.

A much-branched shrub, 3–8 ft. diam. *Leaves* 3½ by 1½ in., subentire, puberulous or glabrate above; petiole ⅜ in. *Cymes* numerous, 1 in. diam., subsessile, nearly glabrous; pedicels often ¼ in., ebracteolate at the apex; bracts at their base minute *Calyx-tube* $\frac{1}{16}$ in.; teeth ⅙ in., linear-lanceolate, appearing woolly on the margins. *Corolla* ½ in., mature puberulous, tubular-inflated nearly from the base, red; limb small, segments ovate subconnivent. *Stamens* 2, glabrous; anthers far-exserted. *Ovary* glabrous. *Capsule* elongate, many-seeded.—Nees marked this *Graptophyllum hortense.*

10. **P. Jenkinsii,** *Clarke*; leaves elliptic acute at both ends glabrous, racemes or small panicles axillary grey pubescent, calyx-segments uniformly grey pubescent.

ASSAM; *Jenkins.*—DISTRIB. Bhamo.

Branches elongate, stout, quadrangular, glabrous, puberulous upwards. *Leaves* 6¼ by 2¾ in., subentire; petiole 1½ in. *Racemes* 1–2½ in., dense-fld., sometimes compound; pedicels 0–⅙ in., closely grey pubescent. *Calyx-tube* $\frac{1}{12}$ in., segments ¼ in., linear-lanceolate. *Corolla* nearly as of *P. pubinervius*, but rather more pubescent; appears to have been orange. *Stamens* 2, glabrous; anthers very shortly exserted. *Ovary* glabrous, 12-ovulate; style glabrous. *Capsule* not seen.—The calyx and corolla of this species are very like those of *P. pubinervius*, but the habit is more that of *P. thyrsiflorus*. Nees marked this *Thyrsacanthus indicus*, regardless of the 2 stamens, and 12 ovules.

XXXII. **CYSTACANTHUS,** *T. Anders.*

Corolla tubular, ventricose upwards; segments 5, ovate, scarcely patent.

Otherwise as *Phlogacanthus.*—Species 4, in Pegu, Tenasserim, and Cochin China.

1. **C. paniculatus,** *T. Anders. in Journ. Linn. Soc.* ix. 458; leaves elliptic acuminate at both ends puberulous on the nerves beneath, panicle terminal ovate-oblong somewhat lax hairy, calyx-segments $\frac{1}{4}$–$\frac{1}{3}$ in.

MOULMEIN; *T. Lobb.*

Branches elongate, stout, tetragonous, glabrous. *Leaves* 5½ by 2¼ in., undulate; petiole hardly $\frac{1}{8}$ in. *Panicle* 7 by 3 in., many-fld.; bracts at the main division 1 by $\frac{1}{4}$ in., glabrous, foliaceous, otherwise very hairy. *Sepals* linear-oblong. *Corolla* 1 in., upper half ventricose, hairy, violet (Lobb); segments ovate, suberect. *Anthers* ncluded. *Capsule* 1¼ by $\frac{1}{3}$ in., very hairy, 16-seeded. *Seeds* lenticular, densely shortly hairy; hairs standing out when wetted.

2. **C. cymosus,** *T. Anders. in Journ. Linn. Soc.* ix. 458; leaves elliptic or lanceolate pubescent on both surfaces, cymes axillary few-fld. Phlogacanthus cymosus, *Kurz For. Fl.* ii. 246.

BURMA; *Brandis.*

A shrub; branches puberulous, internodes short. *Leaves* 3–4 by $\frac{3}{4}$–1½ in., acute at both ends, softly silky beneath; petiole 1 in. *Cymes* viscous-hairy; pedicels $\frac{1}{4}$ in. *Sepals* $\frac{2}{3}$ in., linear-oblong, very hairy. *Corolla* 1¼ in., inflated upwards, viscous; lobes small, subequal. *Capsule* 1¼ by $\frac{1}{4}$ in., tomentose.—Mostly copied from T. Anderson, the Kew example being imperfect; but it is sufficient to show that the species is congeneric with *C. paniculatus,* which Bentham (Gen. Pl. ii. 1098) doubts.

3. **C. pulcherrimus,** *Clarke*; leaves large elongate-lanceolate glabrous, panicle terminal linear, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. Loxanthus Gomezii, *Nees in DC. Prodr.* xi. 322 (*as to the Mergui plant*). Phlogacanthus pulcherrimus, *T. Anders. in Journ. Linn. Soc.* ix. 507; *Kurz For. Fl.* ii. 246.

MERGUI; *Griffith* (Kew Distrib. n. 6155, *partly*). MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

A shrub. *Leaves* 8 by 2 in., acuminate at both ends, subentire; petiole 1 in. *Panicle* 4–18 by $\frac{3}{4}$ in., nearly glabrous; proper bracts small, but foliaceous; other bracts $\frac{3}{4}$ by $\frac{1}{4}$ in. are sometimes scattered throughout the panicle; pedicels 0–$\frac{1}{6}$ in. *Calyx-tube* $\frac{1}{16}$ in., teeth linear, slightly or densely pubescent. *Corolla* 1 in., tubular-funnel-shaped, somewhat curved, nearly glabrous, appears to have been green-yellow with purple spots; lobes ovate, erect-patent. *Filaments* very hairy at the base; connective minutely hispid on the back. *Capsule* $\frac{3}{4}$–1 in., stout, glabrous.—This was no part of the original *Loxanthus Gomezii,* Nees (in Wall. Pl. As. Rar. iii. 99).

VAR. ? *bracteosa*; panicle ashy pubescent, bracts and bracteoles numerous large oblong or linear-spathulate, corolla straight subsymmetric.—Pegu; *Brandis.* Tenasserim, Mooleyit, *Beddome.* Mergui, *Griffith* (Herb. Propr. n. 875).

4. **C. insignis,** *Clarke*; leaves large broadly elliptic acute at both ends glabrous, panicle terminal dense slightly pubescent, calyx-teeth $\frac{1}{6}$ in. Phlogacanthus insignis, *Kurz in Flora* 1870, 364, and in *Journ. As. Soc.* 1870, ii. 79, and *For. Fl.* ii. 246.

PEGU; in tropical forests up to 3000 ft., *Kurz, Brandis.*

An evergreen meagre shrub, 3–5 ft.; stem tetragonous, white. *Leaves* 9 by 4¼ in.; petiole 1 in. *Panicles* 2–4 in., sessile, compound oblong; bracts minute, linear, a few foliaceous $\frac{3}{4}$ in. sometimes interspersed. *Corolla* 1¼ in., ventricose for $\frac{2}{3}$ its length, dark violet golden villous in the throat (Kurz); lobes $\frac{1}{3}$ in., broadly lanceolate, subequal, nearly erect. *Filaments* and *style* glabrous. *Capsule* 1⅓ by $\frac{1}{3}$ in., cylindric, glabrate, 10-seeded. *Seeds* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., compressed, orbicular, fulvous-hairy.

XXXIII. **DIOTACANTHUS,** *Benth.*

Corolla-tube short, limb large ventricose 2-lipped. Otherwise as *Phlogacanthus* or *Cystacanthus*.—Species 2, S. Malabaria.

1. **D. grandis,** *Benth. in Gen. Pl.* ii. 1101; glabrous, leaves large lanceolate or obovate-lanceolate, panicles axillary peduncled many-fld. mostly exceeding the leaves, corolla crimson. Phlogacanthus grandis, *Bedd. Ic. Pl. Ind. Or.* t. 179.

TINNEVELLY and TRAVANCORE, alt. 3–4000 ft.; *Beddome.*

A shrub, 8–12 ft. *Leaves* 7 by 2 3/4 in., attenuate at both ends, undulate, obscurely crenate; nerves 12 pair; petiole 3/4 in. *Peduncles* 2–5 in., stout, compressed; panicles often 4–8 in.; bracts at its divisions 3/8 in., linear; proper bracts 1/8 in., linear. *Sepals* 1/4 in., linear. *Corolla* minutely pubescent, tube 1/6 in., limb 3/4 in.; upper lip emarginate, lower shortly 3-lobed. *Filaments* as long as the corolla, stout, minutely scabrous. *Style* minutely pubescent, subentire. *Capsule* 1 by 1/3–1/6 in., 24-seeded. *Seeds* much compressed, orbicular in outline, minutely crisped-pubescent.

2. **D. albiflorus,** *Benth. in Gen. Pl.* ii. 1101; nearly glabrous, leaves elliptic acute at both ends, panicles axillary peduncled few-fld. shorter than the leaves, corolla pure white. Phlogacanthus albiflorus, *Bedd. Ic. Pl. Ind. Or.* t. 180.

S. TINNEVELLY, alt. 3–5000 ft., and near Courtallum, *Beddome.*

A shrub, 6–10 ft. *Leaves* 5 by 1 3/4 in., subentire; nerves 7 pair; petiole 1/3–1/2 in. *Peduncles* 1–2 in., slender; panicles 1–1 1/2 in., depressed corymbiform. *Calyx, corolla* and *capsule* nearly as of *D. grandis.*—Beddome describes the filaments as "much dilated below, articulated near the apex, quite black above the articulation;" this character being remarkable in the *Acanthaceæ,* Mr. Bentham refers to (Gen. Pl. ii. 1101) the articulation of the filaments. But in a prolonged examination of the very filaments supplied by Beddome no articulation whatever has been made out by myself and Prof. Oliver.

XXXIV. **LEPIDAGATHIS,** *Willd.*

Herbs or undershrubs, with often pubescent bracts or leaves. *Leaves* entire or crenate-serrate. *Flowers* sessile, usually capitate, sometimes opposite or solitary; heads terminal or axillary, dense (rarely lax), usually 1-sided, often fascicled; bracts usually larger than the calyx-segments, rarely small; bracteoles narrower than the bracts. *Calyx* deeply 5-lobed; segments unequal, the 2 anterior more or less connate (calyx 4-partite). *Corolla* small (except in *L. longifolia*), tubular, suddenly ventricose in the middle, 2-lipped; lower lip 3-lobed, patent, usually spotted. *Stamens* 4, didynamous; anthers all 2-celled; cells oblong, muticous, parallel, or one lower somewhat divergent. *Stigma* capitellate, minutely bifid or entire. *Capsule* 2- or 4-seeded, elongate conoid or oblong. *Seeds* compressed, ovate-oblong, or orbicular, hairy.—Species 50 tropical, whereof 2 only are American.

Lepidagathis falcata & dulcis, *Wall. Cat.* 7166, 7167, came from Ava, outside the bounds of British India.

Sect. 1. *Capsule* 2-seeded, elongate-conic, dorsally scarious, thin, irregularly tearing, only ultimately 2-valved from the subsolid tip. *Seeds* ovate-lanceolate, with very long hair spreading elastically when wet, very mucilaginous.

* *Spikes chiefly aggregated, globose, near the base of the stem.*

1. **L. cristata,** *Willd. Sp. Pl.* iii. 400; leaves linear or oblong nearly glabrous, bracts and bracteoles elliptic ovate or obovate suddenly spinose-acuminate, sepals elliptic or obovate suddenly spinulose in fruit thickened very hairy upwards. *Roxb. Cor. Pl.* iii. 63, t. 267, and *Fl. Ind.* iii. 53; *Wall. Cat.* 2421, *chiefly*; *Nees Monogr. Lepidag.* 25, and in *Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 256, *Var. a only*; *Wight Ill.* t. 164 b, fig. 5, and *Ic.* t. 455; *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 494. L. Shuteri, *T. Anders. l. c.*—Lepidagathis sp. n. 18, *Herb. Ind. Or. H. f. & T.*

COROMANDEL, in the tropical region, frequent; *Rottler*, *Wight* (Herb. Propr. n. 1971), &c.

Rootstock perennial; stems 6–18 in., branched, procumbent, quadrangular, puberulous or slightly pubescent. *Leaves* 1 by ¼ in., sessile, lineolate above, minutely scabrid-pubescent on the nerves beneath or glabrate. *Inflorescence* subradical, globose; one or two smaller heads sometimes added on the lower part of the leafy branches; bracts ½ in., rigid in fruit; bracteoles membranous, hairy, spinescent. *Calyx* sub-4-partite, one segment bifid; segments upwards thickened, oblong obtuse with a mucro, hairy, in fruit densely hairy. *Corolla* ⅓ in., densely hairy in bud, white with brown or purple spots in the palate. *Stamens* glabrous; anther-cells one slightly above the other, papillose-ciliate. *Ovary* glabrous. *Capsule* ¼ in.—T. Anderson's specimens of *L. Shuteri* are merely the fruiting states of *L. cristata*, with particularly glabrous leaves, &c. His description again appears drawn up chiefly from *L. mitis*. The older botanists did not separate *L. cristata* from the 2 following, and Willdenow's original description does not mention the bracts, and may belong to all of the three. So Roxburgh's picture cited shows obtuse bracts; but his description says "bracts lanceolate ciliated pointed," which may have been taken from *L. Hookeri*.

VAR. *rupestris*; stem pubescent, leaves elliptic pubescent on both surfaces. L. rupestris, *Nees in Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 256; *T. Anders. in Journ. Linn. Soc.* ix. 494.—Coromandel (?), *Wight* (Herb. Propr. n. 1970).

2. **L. Hamiltoniana,** *Wall. Cat.* 2422; leaves linear or narrowly oblong nearly glabrous, bracts lanceolate spinescent patently ciliate upwards, calyx-lobes lanceolate spinescent not thickened upwards. *Nees Monogr. Lepidag.* 23, and in *Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 255. L. Beddomei, *T. Anders. in Journ. Linn. Soc.* ix. 499.

BEHAR, alt. 1000 ft.; R. Sone at Rotasghur, *J. D. H.*; Bhagulpore, *Hamilton*. BUNDELKUND; *Edgeworth*. JUBBULPORE; *Beddome*. CHOTA NAGPORE, alt. 1–3000 ft., plentiful.

Closely resembling *L. cristata* in habit, leaves and inflorescence. *Bracts* long-tapering upwards, with long white hairs on their margins. *Calyx-segments* tough-membranous. *Corolla* with adpressed straight white hairs, not densely furred as in *L. cristata*.—The flowers in Beddome's example are detached; T. Anderson describes them as terminal, which is certainly not the case.

3. **L. mitis,** *Dalz. in Hook. Kew Journ.* iii. 226; leaves oblong pubescent scabrous on the nerves beneath, flower-heads not prickly, bracts softly membranous obtuse or shortly acute. *Dalz. & Gibs. Bomb. Fl.* 191.

W. DECCAN PENINSULA; Concan, Belgaum, Mangalore, *Wight*, *Stocks*, &c.

Closely allied to *L. cristata*. *Stems* usually acutely quadrangular, puberulous or pubescent. *Leaves* 1¼ by ¼–½ in., broader than in the two preceding species, often distinctly scabrid-ciliate. *Bracts* chaffy, purple or yellow.—Seems well separated from *L. cristata*, but the bracts pass insensibly into the following var.

VAR. *subarmata*; bracts lanceolate soft or subspinescent or rigidly spinous. L. cristata *var.* latifolia, *Nees in DC. Prodr.* xi. 256; *Dalz. & Gibs. Bomb. Fl.* 191. L.

cristata, *Wall. Cat.* 2421, *letter* C. L. rupestris, *Bedd. Ic. Pl. Ind. Or.* t. 229.—Malabaria; frequent, *Wight*, &c.—This form differs from *L. Hamiltoniana* by its much wider usually ciliate leaves.

** *Spikes mostly axillary scattered.*

4. **L. trinervis,** *Nees Monogr. Lepidag.* 21, and in *Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 254; leaves linear or linear-lanceolate entire glabrous 3-nerved, bracts ovate or obovate spinose-cuspidate glabrous or cobweb-ciliate, corolla white. *T. Anders. in Journ. Linn. Soc.* ix. 495. Barleria ? trinervis, *Wall. Cat.* 2500.

Dry hills of CENTRAL INDIA, alt. 1–2000 ft.; from Bombay Ghauts, *Dalzell*, and Goojerat, *Stocks*, to the Kymore Hills, *J. D. H.*, and Chota Nagpore. SIKKIM (probably base of the hills), *Herb. Griffith*. N.W. HIMALAYA ? *Herb. Falconer*.

Rootstock woody; stems numerous, 5–10 in. *Leaves* 1¼ by ⅛–¼ in., sessile, muticous, lineolate above; midrib beneath distinct, with 2 slender nerves parallel to it near the margins. *Spikes* ⅔ in., ovoid, often numerous, generally near the base of the stems, sometimes all conglomerated into a subradical globe as in *L. cristata*; bracts ½–¾ in., nearly half their length occupied by the subsquarrose cusp; bracteoles linear-lanceolate, softly membranous. *Calyx* non-spinescent. *Corolla* and *capsule* nearly as of *L. cristata*.

VAR. *asperrima*, T. Anders. ms.; leaves ⅓ by $\frac{1}{12}$ in. mucronate very scabrous. Lepidagathis sp. n. 21, *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks*.—*Stem* 6 in., branched, stoutly lignescent; branches numerous, internodes very short.

5. **L. lutea,** *Dalz. in Hook. Kew Journ.* ii. 139; leaves linear or linear-lanceolate nearly glabrous 3-nerved, outer bracts often stout elongate spinous inner much smaller, corolla yellow. *Dalz. & Gibs. Bomb. Fl.* 190; *T. Anders. in Journ. Linn. Soc.* ix. 495.

BOMBAY GHAUTS; *Dalzell, Stocks, Law.*

Rootstock woody; stems 6–20 in., quadrangular, pubescent or nearly glabrous. *Leaves* 2 by ¼ in., sessile, minutely hairy above, glabrous beneath. *Spikes* usually 1–3 together in many of the axils, and also a subradical congested globe, pubescent; outermost bract of each spike often 1–2 in. with a very stout bayonet-like tip; inner bracts ⅓–½ in., membranous, acute or shortly spinescent. *Calyx* shortly spinescent or innocuous. *Corolla* ⅓ in. (fide Dalzell); but appears only ½ in. in the dried specimens, much as of *L. cristata*.

6. **L. spinosa,** *Wight*; *Nees in Wall. Pl. As. Rar.* iii. 97, and *Monogr. Lepidag.* 32, and in *DC. Prodr.* xi. 258; leaves obovate spinous-mucronate mostly entire glabrous, bracts broadly oblong acuminate spinescent. *T. Anders. in Journ. Linn. Soc.* ix. 495. Barleria ? spinosa, *Wall. Cat.* 2497. Acanthus mucronatus, *Heyne in Herb. Rottler*.

CARNATIC and MYSORE; *Rottler, Wight, Hamilton*, &c.

A prostrate, much-branched perennial, 6–20 in. *Leaves* ½ by ¼–⅓ in., sessile, usually with one spine only at the tip, rarely 1–2 spines on the margins added. *Heads* ½–¾ in., scattered, ovoid, few-fld.; outer barren bracts numerous, ⅔ in. including the strong spine, rigid; inner bracts and bracteoles softer; calyx (or its inner segments at least) villous muticous. *Corolla* and *capsule* as of *L. cristata*.

7. **L. pungens,** *Nees in Wall. Pl. As. Rar.* iii. 97, and in *Monogr. Lepidag.* 33, and in *DC. Prodr.* xi. 58; leaves ovate spinous-serrate glabrous, bracts lanceolate or ovate lanceolate spinous-mucronate. *Wight Ic.* t. 456; *T. Anders. in Journ. Linn. Soc.* ix. 495. Barleria ? pungens, *Wall. Cat.* 2498.

S. MADRAS; *Rottler, Wight, G. Thomson.*

Nearly all the leaves with 2–3 strong spines on each margin; otherwise closely resembling *L. spinosa.*

8. **L. clavata,** *Dalz. in Hook. Kew Journ.* ii. 340; leaves sessile ovate subentire spinous-mucronate glabrescent, spikes solitary terminal oblong or subclavate, bracts sub-4-ranked resembling the leaves but woolly. *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 495.

BOMBAY GHAUTS and SYHADREE MTS.; *Dalzell, Stocks.*

Rootstock stout, woody; stems several 8–12 in., erect, undivided or rarely divided, lower leaves caducous. *Leaves* 1 in., rigid, plicate, squarrose, slightly ciliate or glabrate. *Spikes* 1–3 in., dense, harsh; lower bracts altogether as the leaves, upper smaller, becoming very woolly; bracteoles resembling the calyx-segments. *Calyx* ½ in.; segments unequal, silky. *Corolla* ¾ in. as of *L. cristata,* but (fide Dalzell) rose. *Capsule* and *seeds* as of *L. cristata.*

9. **L. prostrata,** *Dalz. in Hook. Kew Journ.* ii. 138; leaves sessile ovate subentire spinous-mucronate pubescent, spikes terminal on short lateral branches ovate or oblong, bracts resembling the leaves. *Dalz. & Gibs. Bomb. Fl.* 190; *T. Anders. in Journ. Linn. Soc.* ix. 495.

W. DECCAN PENINSULA; Concan, *Dalzell, Stocks;* Canara, *Ritchie.* SUBTROPICAL W. HIMALAYA; Kangra, alt. 1–4000 ft., *Clarke.*

Rootstock woody; branches 6–15 in., prostrate, much branched pubescent. *Leaves* ½–1 in., rigid, plicate, squarrose, strongly nerved. *Spikes* ½–2 in., in appearance axillary, dense, varying much in length; lower bracts as the leaves, upper smaller. *Calyx* ⅓–½ in., villous; inner segments smaller, not spinescent. *Corolla* and *capsule* as of *L. clavata,* to which this species appears closely allied, though differing so greatly in habit.

10. **L. diffusa,** *Clarke;* leaves sessile linear or elliptic entire muticous glabrescent, spikes ovate axillary often clustered, bracts lanceolate acuminate spinescent. Barleria diffusa, *Wight in Herb. Propr.*

DECCAN PENINSULA; *Wight;* Bellary, *Beddome.*

Rootstock woody; branches 3–10 in., prostrate, much-divided, nearly glabrous. *Leaves* 1 by $\frac{1}{12}$–⅓ in., varying considerably on the same plant, sometimes acute almost mucronate. *Spikes* ½–¾ in., dense, hairy, mostly towards the upper ends of the stems, really terminal on much-shortened lateral branches; bracts ⅓ in. *Calyx* 4-partite, villous; 2 outer segments lanceolate undivided, inner narrower. *Corolla* ½ in.—Wight doubtless referred this to *Barleria* because both the outer larger calyx-segments are undivided. The corolla, stamens and capsule are altogether as of *L. cristata.*

Sect. 2. *Capsule* 4-seeded, oblong, early 2-valved from the apex. *Seeds* ovate or orbicular, with very short hairs elastic when wetted.

* *Leaves entire or undulate.*

11. **L. rigida,** *Dalz. in Hook. Kew Journ.* ii. 341; softly hairy, leaves linear-lanceolate muticous, spikes oblong dense terminal often appearing clustered, bracts narrowly ovate shortly spinescent. *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 495.

BOMBAY GHAUTS; *Dalzell, Stocks,* &c. SCINDE (*T. Anderson*).

Suffruticose, 1–2 ft. (at least), erect, softly hairy. *Leaves* 3½ by ½ in., attenuate at both ends, glandular-pubescent on both surfaces; petiole indistinct. *Spikes* ½–2½ in., often appearing as in terminal clusters on shortened lateral branches; bracts ⅓–½ in., entire, rigid. *Corolla* ½ in., yellow-white. *Capsule* ⅓ in., 4-seeded. *Seeds* $\frac{1}{12}$ in. diam.—The inflorescence, capsule and seeds approach those of *L. hyalina.*

12. **L. cuspidata,** *Nees in Wall. Pl. As. Rar.* iii. 97, and *Monogr. Lepidag.* 31, and in *DC. Prodr.* xi. 258; leaves elliptic or ovate attenuate at both ends puberulous, spikes dense or very lax pubescent, bracts ovate cuspidate 3-nerved. *T. Anders. in Journ. Linn. Soc.* ix. 495; *Bedd. Ic. Pl. Ind. Or.* t. 227. Ruellia cuspidata, *Wall. Cat.* 2405.

TROPICAL INDIA; extending from W. Himalaya, *Falconer, Edgeworth,* to COORG, *Rottler,* and MALABAR from the plains nearly to the top of the Ghauts.

Shrubby; stems 1–$2\frac{1}{2}$ ft., erect or diffuse, glabrous or pubescent towards the apex. *Leaves* of the main stem $4\frac{1}{2}$ by $1\frac{3}{4}$ in., muticous; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; on the lateral flowering branches the leaves are mostly 1 in., sessile, mucronate. *Spikes* 1 in., dense, or 6 in. lax with the flowers in distinct opposite pairs; bracts $\frac{2}{3}$ by $\frac{1}{3}$ in. *Calyx* $\frac{1}{2}$ in., 5-partite. *Corolla* scarcely $\frac{1}{3}$ in., whiteish with purple spots. *Capsule* 4-seeded.

13. **L. calycina,** *Hochst.*; *Nees in DC. Prodr.* xi. 252; leaves petioled oblong entire nearly glabrous, spikes numerous small ovoid sparingly scabrid puberulous, bracts obovate 3-nerved aristate not spinescent. *T. Anders. in Journ. Linn. Soc.* ix. 496; *Boiss. Fl. Orient.* iv. 525. L. strobilifera, *Stocks in Hook. Kew Journ.* iv. 177.

SCINDE; *Stocks.*—DISTRIB. Beloochistan, Abyssinia.

A small, erect, rigid, much-branched undershrub. *Leaves* $1\frac{1}{2}$ by $\frac{1}{3}$ in., lineolate, obscurely ciliate-pubescent; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Heads* $\frac{3}{4}$ in., appearing sessile often conglomerate; bracts $\frac{1}{3}$ by $\frac{1}{5}$ in., scarious, 3–5 nerved, scabrid-puberulous on the nerves; bracteoles $\frac{1}{4}$ in., linear, ciliate. *Calyx* 4-partite; 2 outer segments $\frac{1}{3}$–$\frac{1}{2}$ in. broad, scarious, nerved, one bifid half-way down; 2 inner segments $\frac{1}{4}$–$\frac{1}{3}$ in., linear. *Corolla* $\frac{1}{2}$ in., white, lower lip purple-spotted. *Capsule* nearly $\frac{1}{3}$ in., 4-seeded.

14. **L. chlorostachya,** *Nees in DC. Prodr.* xi. 256; leaves large petioled elliptic acuminate at both ends glabrous, spikes axillary oblong dense ciliate scarcely pubescent, bracts and bracteoles narrowly lanceolate mucronate scarcely spinescent. *T. Anders. in Journ. Linn. Soc.* ix. 496.

MERGUI; *Griffith* (Kew Distrib. n. 6141).

Shrubby, erect. *Leaves* $6\frac{1}{4}$ by $1\frac{3}{4}$ in., entire membranous; petiole $\frac{1}{2}$–1 in. *Spikes* 2 by $\frac{1}{2}$ in., subsessile, mostly solitary in each axil sometimes 2 together, erect, 1-sided or subsymmetric; bracts $\frac{1}{2}$ by $\frac{1}{12}$ in., white ciliate, subsymmetric or in the 1-sided spikes falcate; bracteoles similar rather smaller. *Calyx* 5-partite; segments linear-lanceolate, nearly similar. *Corolla* $\frac{1}{2}$ in., and *stamens* as of *L. hyalina.* *Capsule* oblong, 4-seeded.

15. **L. subuninervia,** *Clarke*; spikes linear-oblong pubescent, bracts linear-lanceolate sub-1-nerved ciliate mucronate. Neuracanthus subuninervius, *Kurz in Journ. As. Soc.* 1873, pt. ii. 95.

PROME HILLS; *Kurz.*

The fragment on which Kurz founded this species is the leafless base of a stem, whence arise 2 erect spikes, very similar to those of *L. chlorostachya,* but pubescent as well as ciliate, and the bracts rather smaller. *Stamens* 4; anthers all 2-celled, cells superposed; filaments slightly bearded at the apex. *Style* glabrous, stigma small minutely bifid.—The stamens and bracts are not those of a *Neuracanthus*; and the fragmentary solitary specimen is so like *L. chlorostachya* that it might be merely a burnt-down hill specimen of it.

16. **L. purpuricaulis,** *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 27, and in *DC. Prodr.* xi. 257; leaves lanceolate or ovate-lanceolate pubescent, spikes axillary sessile solitary or clustered oblong hairy, bracts lanceolate or ovate-lanceolate mucronate striate, calyx sub-5-partite one segment broad the other 4 very narrow. *T. Anders. in Journ. Linn. Soc.* ix.

496. L. striata, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 26, and in *DC. Prodr.* xi. 257, and in *Wall. Cat.* 7165. Ruellia mucronata, *Wall. Cat.* 2366, sheets β, δ, ζ.

SUBTROPICAL W. HIMALAYA; Hooshianpur, *Aitchison*; Hurdwar, *Wallich*; Kumaon, *Strachey & Winterbottom*. CHOTA NAGPORE; Parasnath, *Edgeworth*; Rajmahl, *Watt*. PROME HILLS; *Wallich*.

Stems herbaceous, 8–24 in., suberect or diffuse, glabrous or hairy, often purple. *Leaves* 1–5 in., sometimes in unequal pairs; larger attenuate at both ends glabrate, smaller subovate more pubescent. *Spikes* $\frac{1}{2}$–$1\frac{1}{2}$ in., dense; bracts $\frac{1}{3}$ by $\frac{1}{6}$ in.; bracteoles $\frac{1}{4}$ in., linear-falcate. Large *sepal* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{5}$ in.; 2 next $\frac{1}{5}$ in., linear-lanceolate, 2 inner linear. *Corolla* and *capsule* as of *L. hyalina*, from which this species differs very little.

17. **L. dulcis,** *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 30, and in *DC. Prodr.* xi. 257, and in *Wall. Cat.* 7167; leaves petioled elliptic narrowed at both ends pubescent on the nerves beneath, spikes axillary ovoid or somewhat elongate hairy, bracts elliptic scarious, calyx sub-5-partite, outer segment broad. *T. Anders. in Journ. Linn. Soc.* ix. 496. Ruellia dulcis, *Wall. Cat.* 7167.

PROME HILLS; *Wallich*. PEGU; *Kurz*.

Annual *stems* 6–12 in., subundivided, flexuose, in appearance procumbent, somewhat pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., undulate, soon glabrate above; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* 1 by $\frac{1}{2}$ in., mostly solitary opposite, 1-sided; bracts $\frac{1}{3}$ by $\frac{1}{6}$ in., somewhat obovate, apiculate not spinescent, nerved, scarious, ciliate; bracteoles similar, but rather smaller, subfalcate. Outer *sepal* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., obovate, nerved, scarious, ciliate; 2 next $\frac{1}{3}$ by $\frac{1}{8}$ in. falcate, 2 inner $\frac{1}{4}$ in. linear. *Corolla* $\frac{1}{2}$ in. (Nees). *Capsule* exceeding $\frac{1}{4}$ in., 4-seeded.

18. **L. scariosa,** *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 15, and in *DC. Prodr.* xi. 251; leaves petioled ovate furfuraceous-pubescent, spikes mostly terminal ovoid dense, bracts narrowly obovate mucronate, outer calyx-segment large obovate scarious. *Wight Ic.* t. 457; *T. Anders. in Journ. Linn. Soc.* ix. 497. L. terminalis, *Hochst.*; *Nees in DC. Prodr.* xi. 251. Ruellia scariosa, *Wall. Cat.* 2354.

S. DECCAN PENINSULA; Coimbatore, *Wight*; S. Canara, *Beddome*.—DISTRIB. Abyssinia.

A small undershrub; branches numerous, much-divided, stellately woolly or glabrate. *Leaves* 2 by $1\frac{1}{4}$ in., hardly acute, undulate; petiole 0–$\frac{1}{2}$ in. *Spikes* 1 in. diam., solitary or 2–3, conglomerate, all at the tips of the branches; bracts $\frac{1}{3}$ in., ciliate, scariose; bracteoles $\frac{1}{5}$ in., nearly linear. *Calyx* $\frac{1}{2}$ in., sub-5-partite; outer segment $\frac{1}{4}$ in. broad; 2 next $\frac{1}{12}$ in. broad, 2 innermost linear. *Corolla* $\frac{1}{2}$ in. and upwards. *Capsule* $\frac{1}{3}$ in., 4-seeded.—T. Anderson, as well as Nees, keeps *L. terminalis* distinct; but the only difference is that the corolla in *L. terminalis* is $\frac{3}{4}$ in., whereas in *L. scariosa* it must not exceed $\frac{2}{3}$ in.

19. **L. simplex,** *T. Anders. in Journ. Linn. Soc.* ix. 497; leaves sessile narrowly oblong glabrous, spikes terminal solitary ovoid or ellipsoid, bracts and bracteoles narrowly obovate white-ciliate, calyx sub-5-partite, segments lanceolate submucronate.

TENASSERIM; *Helfer* (Kew Distrib. n. 6140).

Stem simple, 4–10 in., erect, glabrous, 4-angular. *Leaves* 1 by $\frac{1}{8}$ in., rigid, obtuse, entire, shining. *Spike* $\frac{1}{2}$–1 in., sessile, 1-sided; bracts $\frac{1}{3}$ by $\frac{1}{8}$ in., scarcely acute, scarious; bracteoles similar to the bracts, but rather smaller. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., white ciliate; 2 outer segments oblong, subentire, 2 inner linear. *Corolla* not seen. *Capsule* $\frac{1}{4}$ in., oblong, 4-seeded. *Seeds* densely, elastically hairy.—This looks like a form of *L. hyalina* var. *semiherbacea*.

20. **L. hyalina,** *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 16, and in *DC. Prodr.* xi. 252; leaves petioled ovate or oblong minutely viscid-pubescent, spikes oblong very dense axillary and terminal often clustered ciliate often softly hairy, bracts lanceolate acuminate mucronate, calyx sub-5-partite, segments linear-lanceolate mucronate outer larger, corolla ¼ in. *T. Anders. in Journ. Linn. Soc.* ix. 498. L. incurva, *Don Prodr.* 119. Ruellia dependens, *Roxb. Fl. Ind.* iii. 49; *Wall. Cat.* 2365.

Throughout N. INDIA, alt. 0–4000 ft., very common; from Jamu to Upper Assam and Chittagong. BEHAR and CHOTA NAGPORE, frequent. PEGU and TENASSERIM, common.—DISTRIB. Burma, S. China.

A perennial herb, 1–2 ft. *Leaves* 3 by 1½ in., uppermost often narrower, pendent, undulate; petiole ½ in. *Spikes* ½–1½ in., erect, 1-sided; bracts nearly ½ in.; bracteoles ⅓ in., linear-lanceolate, mucronate. *Sepals* ⅓ in., ciliate, sometimes softly hairy. *Corolla* white with brown spots in the palate. *Capsule* ⅓ in., 4-seeded.—Of this plant so universal in N. India there is no plate extant; nor is there any example of the typical form at Kew collected in the Deccan. Roxburgh says his *Ruellia dependens* is native in Mysore; but the examples in his collections under that name are all the common Bengal form.

VAR. *mollis*; leaves all ovate hairy on both surfaces, heads very softly hairy.—Himalaya Terai, frequent.

VAR. *ustulata*; plant 1–5 in., leaves 1 in., spikes ½–1 in. ovoid, bracts rather larger than in *L. hyalina* type. L. ustulata, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 18, and in *DC. Prodr.* xi. 253. Ruellia mucronata, *Wall. Cat.* 2366, *letters* γ, ε.—Kashmir and N.W. Himalaya, alt. 2–4000 ft., *Thomson, Strachey & Winterbottom*, &c. A very local and easily separable form.

VAR. *mucronata*; leaves ovate pubescent beneath, spikes and heads small or large, bracts ¼ in. L. mucronata, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 11, and in *DC. Prodr.* xi. 250. L. neurophylla, *T. Anders. in Journ. Linn. Soc.* ix. 497. Ruellia mucronata, *Wall. Cat.* 2366, *type sheet.*—Concan, Canara, Nilgherries, &c., *Stocks, Wight, Dalzell*, &c.—Nees founded this species on Wight's plant (Herb. Propr. n. 1968), which has small leaves; subsequently he (in DC. Prodr.) added such specimens from Mergui as had small leaves: these, however, having bracts ⅓–½ in. are nearer *L. purpuricaulis*, though their stems are not very purple. T. Anderson's *L. neurophylla* has full-sized leaves; the bracts are nearly the same as in Var. *mucronata*.

VAR. *lophostachyoides*, Nees in DC. Prodr. xi. 252; leaves large, spikes 2½ by ⅓ in. 1-sided, bracts as in *L. hyalina* type.—Ceylon; *Gardner, Walker*, &c. Bababoodun Hills; *Cleghorn.*—This variety in habit and in details runs very near *L. chlorostachya*, but has the spikes rather slenderer, the bracts rather smaller.

VAR. *semiherbacea*; leaves linear-lanceolate often shining. L. semiherbacea, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Cat.* 7164, and *Monogr. Lepidag.* 20, and in *DC. Prodr.* xi. 253; *Wall. Cat.* 7164. L. iridescens, *T. Anders. in Journ. Linn. Soc.* ix. 496. Lepidagathis sp., *Griff. Notul.* iv. 137.—From Sikkim and Assam to Burma, very common in the Terai and adjacent Tropical Valleys.—*Stems* often elongate, diffuse, with long nodes; the lower stem leaves (in the extreme form of the variety) 7 by ¾ in. But intermediate forms are more common, having the lower leaves ovate, the upper or uppermost oblong or linear, large or small. Some of the examples only differ from *L. simplex*, T. Anders., in having numerous heads.

VAR. *riparia*; leaves large ovate, heads large softly ciliate, bracts ½ in. (or sometimes longer) acuminate long aristate. L. riparia, *Nees in DC. Prodr.* xi. 253. L. aristata, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 19; *Wall. Cat.* 7163 (not Ruellia aristata, Vahl).—Rangoon; *M'Lelland.* Pegu Yomah; *Kurz.* Tenasserim; *Beddome.* Siamese Hills; *Parish.*—Kurz and Beddome have noted on their specimens that this is probably a distinct species; and it seems more distinct from *L. hyalina*, to which T. Anderson reduced it, than some usually admitted species.

21. **L. linearis,** *T. Anders. in Cat. Hort. Calc.* 43, and in *Journ.*

Linn. Soc. ix. 496; leaves subsessile linear acute at both ends scabrous pale beneath, spikes terminal or axillary tetragonal subsecund dense woolly, bracts herbaceous obliquely lanceolate mucronate ciliate 1-nerved, calyx 5-partite membranous ciliate upper segment lanceolate rounded at the tip 3-nerved.

BURMA; *R. Scott.*

Perennial; stems several, 2–3 ft., tetragonous, winged, glabrous. *Leaves* 3–6 in., scabrous. *Spikes* 1–2 in., hoary woolly. Terminal *spikes* 2–3 together, axillary solitary opposite; bracteoles membranous, concave, obovate, obtuse at both ends, ciliate. *Corolla* and *capsule* appear (ex descr.) same as of *L. hyalina* (*T. Anderson*). —Not seen.

** *Leaves crenate or crenate-serrate.* (Anther-cells more separated and more divergent at the base than in the rest of the genus.)

22. **L. ceylanica,** *Nees Monogr. Lepidag.* 35, and in *DC. Prodr.* xi. 259; leaves petioled ovate-lanceolate nearly glabrous, bracts as long as the calyx elliptic or obovate scarious 3-nerved glabrous ciliate. *T. Anders. in Journ. Linn. Soc.* ix. 498. L. nervosa, *Wight Ic.* t. 1620.

CEYLON; *Walker, Thwaites.*

Stems 2–3 ft., herbaceous, diffuse, 4-angular, glabrous. *Leaves* 3 by $\frac{1}{4}$ in., acuminate at both ends, crenate-serrate, obscurely puberulous; petiole $\frac{1}{2}$ in. *Spikes* $\frac{3}{4}$ in., ovoid or obovoid, in dense panicles or clusters; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., mucronate; bracteoles $\frac{1}{3}$ by $\frac{1}{8}$ in., subfalcate, scarious, 3-nerved, ciliate. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in., deeply 5-fid, scarious, glabrous, ciliate; outer segment oblong or elliptic, other 4 narrow. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{4}$ in., 4-seeded.

23. **L. Walkeriana,** *Nees in DC. Prodr.* xi. 260; leaves petioled ovate-lanceolate nearly glabrous, bracts half as long as the calyx elliptic. *Wight Ic.* t. 1530; *T. Anders. in Journ. Linn. Soc.* ix. 499. L. ceylanica, Var. β, *Nees Monogr. Lepidag.* 35.

CEYLON; *Walker, Macrae,* &c.

Bracts $\frac{1}{8}$ in., 3-nerved, subscarious. *Calyx* $\frac{1}{4}$ in., densely minutely glandular-hairy or glabrate ciliate. Otherwise as *L. ceylanica,* which it so greatly resembles that Wight has noted on the specimen he has figured a doubt whether it was the "true *Walkeriana,*" which it certainly is.

24. **L. fasciculata,** *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 10, and in *DC. Prodr.* xi. 260; leaves petioled ovate or ovate-lanceolate pubescent, bracts herbaceous as long as the calyx ovate or elliptic 3-nerved hairy. *T. Anders. in Journ. Linn. Soc.* ix. 498; *Bedd. Ic. Pl. Ind. Or.* t. 228; *Wawra Bot. It. Pr. S. Cob.* i. 88, t. 13. L. hirta, *Nees Monogr. Lepidag.* 37. L. goensis, *Dalz. in Hook. Kew Journ.* ii. 340; *Dalz. & Gibs. Bomb. Fl.* 191. Ruellia fasciculata, *Retz. Obs.* iv. 28; *Roxb. Fl. Ind.* iii. 48; *Wall. Cat.* 2406, and 2394 *partly.*

Throughout TROPICAL and SUBTROPICAL INDIA, from the base of the N.W. HIMALAYA and BENGAL to CEYLON and TENASSERIM; mostly rare, plentiful in Malabaria.

Stems 1 foot, herbaceous, diffuse, hairy. *Leaves* 2 by 1 in., crenate-serrate, pubescent at least on the nerves beneath; petiole $\frac{1}{4}$ in. *Spikes* $\frac{1}{3}$ in. diam., or often elongate, interrupted below with the lower flowers in opposite pairs; bracts $\frac{1}{8}$–$\frac{1}{4}$ in., in fruit somewhat enlarged; bracteoles rather shorter than the bracts, falcate-oblong. *Corolla* and *capsule* nearly as of *L. hyalina.*—This plant always occurs mixed with *Hemigraphis latebrosa,* Nees; without counting the ovules or seeds it may be distinguished therefrom by the presence of bracteoles, the capi-

tellate sub-bifid stigma, the corolla suddenly ventricose in the middle not tubular (as in *Hemigraphis latebrosa*).

VAR. *major*; leaves larger toothed or subentire, heads larger, bracts ½ by ¼ in. acute subspinulose, calyx ⅓ in., corolla ½ in.—Tenasserim; Mooleyit, *Beddome*.—Much finer than the ordinary *L. fasciculata*, of which some examples from moist valleys in Malabar (marked *L. goensis*) come so near this Tenasserim plant that it is difficult to treat the latter as a species.

DOUBTFUL SPECIES.

L. LONGIFOLIA, *Wight Ic.* t. 1564; leaves large lanceolate glabrous, spikes elongate lax terminal subpanicled, bracts large elliptic acute, flowers large, anthers minutely spurred at the base. *T. Anders. in Journ. Linn. Soc.* ix. 499.

MALACCA; *Griffith* (Kew Distrib. n. 6138), *Maingay*.

Branches terete, glabrescent. *Leaves* 9 by 2 in., acute at both ends, entire; petiole ⅜ in. *Spikes* 3–7 by 1 in., clustered towards the end of the branch, lax, nodding, pubescent; bracts ¾ by ¼ in., opposite, one of each pair usually barren; bracteoles ½ in., oblong. *Calyx* nearly ½ in., 5-lobed nearly to the base; 3 segments broadly lanceolate, 2 linear. *Corolla* in form nearly as of *Lepidagathis* but larger, minutely hairy without, nearly glabrous; no traces of dots on the lower lip. *Stamens* 4, slightly didynamous; filaments glabrous, connective papillose; anthers oblong, cells parallel approximate each with a divaricate minute mucro at the base. *Ovary* depressed, glabrous, 4-ovulate; style patently hairy; stigma capitellate (not as in Wight Ic.). *Capsule* not seen.—A remarkable plant, both in habit and characters removed from *Lepidagathis*; in the absence of fruit it is advisable not to found a new genus on it. Nees marked it "Species ab Acanthaceis aliena." In many points it approaches *Asystasia Lawiana* and *Strobilanthes*.

L. STROBILINA, *T. Anders. ms.*; *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; glabrous, leaves lanceolate membranous entire, heads lax terminal largeish, corolla 1 in. funnel-shaped purple-lilac tube short.

MARTABAN; *Parish* (fide Kurz).

A herb, 1–2 ft., stems terete with 4 elevated lines. *Leaves* 7–8 in., acuminate at both ends, shining, petioled. *Bracts* 1 in., oblong-lanceolate acuminate thin-papery, tinged purple-lilac, 1-nerved and reticulated, glandulose-puberulous; bracteoles similar to the bracts but narrower. *Calyx* large. *Capsule* wanting.—Not seen; the foregoing translated from Kurz l. c. Appears ex descr. to be allied to *L. longifolia*.

XXXV. **PHIALACANTHUS,** *Benth.*

An erect, glabrous shrub. *Leaves* large, entire. *Cyme* terminal, loosely corymbose; pedicels slender; bracts minute. *Calyx* membranous, coloured, tubular-campanulate, shortly 5-toothed. *Corolla-tube* elongate, ventricose upwards; limb 2-lipped; lobes 5, subequal, imbricate in bud. *Stamens* 4; anthers all 2-celled; cells oblong, parallel, muticous. *Style* filiform; stigma minutely 2-lobed; ovules 2 in each cell. *Capsule* shortly stalked, oblong, 4-seeded. *Seeds* (unripe) compressed, orbicular in outline, retinacula stout.

P. Griffithii, *Benth. in Gen. Pl.* ii. 1102.

MISHMEE; *Griffith*.

Leaves 7½ by 2½ in., broad-elliptic, acuminate at both ends, bearing raphides on both surfaces; petiole 1½ in. *Cymes* 3 in. diam., short-peduncled; lower bracts ¼ in., linear, upper minute; pedicels ¼ in. *Calyx* ¼ by ⅛ in., enlarged in fruit; teeth 1/18 in., triangular. *Corolla* 1¾ in., orange with yellow mouth (Griffith). *Stamens* glabrous; anthers minutely pubescent. *Style* glabrous. *Disc* small, cup-shaped. *Capsule* (unripe) ¾ in., glabrous.

XXXVI. **MONOTHECIUM,** *Hochst.*

Diffuse herbs. *Leaves* entire. *Spikes* small, ovate or oblong, dense;

bracts and bracteoles linear or setaceous. *Sepals* 5, equal, linear-setaceous. *Corolla* small, tubular, limb deeply 2-lipped. *Stamens* 2; anthers narrowly oblong, 1-celled, muticous, attached by the middle of the back. *Style* minutely bifid. *Capsule* oblong, on a short solid stalk, 4-seeded. *Seeds* compressed, orbicular, rugose subtubercled; retinacula stout.—Species 2, Indian and Tropical African.

M. aristatum, *T. Anders. in Thwaites Enum.* 234; leaves ovate or ovate-lanceolate pubescent on the nerves beneath, bracts $\frac{1}{4}$–$\frac{1}{3}$ in. linear setaceous lineolate. *Bedd. Ic. Pl. Ind. Or.* t. 269. Justicia aristata, *Wall. Cat.* 2481; *Nees in Wall. Pl. As. Rar.* iii. 115. Anthocometes aristatus, *Nees in DC. Prodr.* xi. 312.

CEYLON; *Walker, Wight,* &c. NILGHERRY MTS.; *G. Thomson.*

Stems 1 foot, procumbent, much branched, often rooting. *Leaves* 1½ by ¾ in., cuneate at both ends; petiole $\frac{1}{3}$ in. *Spikes* ½–1½ in., peduncled or sessile, pubescent or nearly glabrous; bracteoles 0 (barren bracts frequent). *Sepals* ¼ in. *Corolla* $\frac{1}{3}$ in., white, lower lip brown-spotted. *Capsule* ¼ in.—This is so like *Justicia procumbens* that an example of it in Herb. Kew is marked "*Rostellularia procumbens,* Var. *α* or *β*," by Nees' hand.

XXXVII. CLINACANTHUS, *Nees.*

A tall herb, minutely pubescent. *Leaves* ovate-lanceolate, entire or toothed. *Flowers* conspicuous, dull red, in small drooping cymes at the tips of the branches; bracts and bracteoles small, linear. *Sepals* 5, equal, linear-subulate. *Corolla-tube* elongate, curved at the base, widened upwards; limb 2-lipped. *Stamens* 2; anthers scarcely exserted, 1-celled, narrowly oblong, muticous, attached by the middle of the back. *Style* minutely bifid. *Capsule* oblong, on a short solid stalk, 4-seeded. *Seeds* muricate (Nees).

Only differs from *Hypoestes* by the small bracts.

C. Burmanni, *Nees in DC. Prodr.* xi. 511. Justicia nutans, *Burm. Fl. Ind.* 10, t. 5, fig. 1. J. fulgida, *Blume Bijd.* 784. Beleropone? fulgida, *Hassk. Cat. Hort. Bogor.* 151.

MALACCA; *Maingay.*—DISTRIB. Java, Borneo, Hainan.

Leaves 2½ by 1 in., acuminate, base cuneate or rounded; petiole ¼ in., puberulous. *Cymes* about 5-fld.; bracts $\frac{1}{8}$ in., linear; pedicels $\frac{1}{16}$ in. *Sepals* ¼ in., rusty pubescent. *Corolla* 1¼ in., lobed $\frac{1}{3}$–½ in. *Stamens* and *pistil* glabrous.

XXXVIII. JUSTICIA, *Linn.*

Herbs or shrubs. *Leaves* entire. *Flowers* sessile or nearly so, spiked or panicled (rarely solitary), small or middle-sized; bracts large or small; bracteoles narrow or 0. *Calyx* 5- or 4-partite; segments narrow. *Corolla-tube* shorter, or scarcely longer, than the 2-lipped limb; upper lip 2-lobed or subentire, lower 3-lobed, lobes imbricate in bud. *Stamens* 2, filaments often dilated, hairy near the base; anthers 2-celled; cells oblong or round, usually more or less separate, lower always with a white basal appendage. *Ovary* 4-ovulate; style filiform, shortly bifid. *Capsule* ovoid or ellipsoid, 4-seeded from the base, or with a long solid cylindric stalk 4-seeded at the apex. *Seeds* ovoid, more or less compressed, tubercular, scaly or glochidiate-subspinescent (appearing hispid), never with fine elastic hairs springing out when wetted.—Species 100, in the warm regions of both hemispheres.

Justicia bivalvis, Roxb. Fl. Ind. i. 124, came from the Moluccas, and was probably a *Dicliptera*; though Roxburgh quotes his species as the same as Linnæus' under that name, he excludes (correctly) the plate on which Linnæus founded his species.

Gendarussa virgata, Wall. Cat. 7176, was collected in Ava, outside the bounds of British India.

Justicia inconspicua, Wall. Cat. 2475, collected in Penang, is not in Wallich's Herbarium at the Linn. Soc., nor are there any data for determining its genus.

Sect. 1. **Hemichoriste.** Shrubby. *Spikes* elongate; flowers clustered; bracts herbaceous, subovate. *Corolla* and *capsule* large.

1. **J. montana,** *Wall. Cat.* 2471, *not of Roxb.*; leaves large elliptic acute at both ends glabrous, spikes near the ends of the branches subpaniculate, inflorescence subviscidly pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 509; *Benth. in Gen. Pl.* ii. 1109. J. longifolia, *Wall. Cat.* 2437. Hemichoriste montana, *Nees in Wall. Pl. As. Rar.* iii. 102, and in *DC. Prodr.* xi. 367; *Dalz. & Gibs. Bomb. Fl.* 194; *Wight Ic.* t. 1538.

W. DECCAN PENINSULA, in the Ghauts, from Mahabelaishwur (*Law*) to Nilgherries (*Wight*).

Stem erect, subtetragonous, puberulous upwards. *Leaves* 9 by 3½ in., both surfaces punctulate; petiole 1 in. *Spikes* 6–15 in., the terminal often paniculately branched; lower clusters of flowers usually distant, upper continuous; bracts ¼ by ⅛ in., lower larger; bracteoles smaller, elliptic, near the base of the pedicel; pedicels 0–⅛ in. *Sepals* 5, ¼ in., sublinear, pubescent. *Corolla* 1–1¼ in., 2-lipped half its length, minutely pubescent, red. *Stamens* 2 (without any rudiments); lower anther-cells long-spurred. *Capsule* 1 in., clavate, pubescent, 4-seeded near the top. *Seeds* glabrous, intensely rugose, but possibly smooth when fully ripe.—Nees says "stamens 4, 2 shorter with 1-celled anthers or rudimentary;" but there is no trace of these shorter stamens in the example named by Nees' hand.

Sect. 2. **Betonica.** Shrubs or herbs. *Spikes* continuous; bracts ovate or elliptic, often 4-ranked, mostly imbricate. *Calyx-segments* 5, nearly equal.

* *Bracts white, green-nerved.*

2. **J. Betonica,** *Linn.*; *Roxb. Fl. Ind.* i. 128; tall shrubby puberulous, leaves ovate-lanceolate, bracteoles large ovate-lanceolate, corolla ½ in. white rose-spotted. *Burm. Fl. Ind.* 8; *Wall. Cat.* 2433; *T. Anders. in Journ. Linn. Soc.* ix. 510; *Kurz For. Fl.* ii. 247. J. ochroleuca, *Blume Bijd.* 786. Adhatoda Betonica, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 385.—*Rheede Hort. Mal.* ii. t. 21.

Throughout INDIA and CEYLON, common; often cultivated.—DISTRIB. Malaya, Tropical Africa.

Branches terete, glabrous, tips pubescent. *Leaves* 3 by 1¾ in. (lower sometimes much larger), punctulate on both surfaces, not lineolate, base shortly attenuate; petiole ⅓ in. *Spikes* 1–4 by ¾ in., short-peduncled, terminal, often on short lateral branches appearing lateral; bracts ⅔ by ⅓ in., ovate acute, white, minutely pubescent; bracteoles ⅓–½ in., similar to the bracts. *Sepals* ⅙ in., linear-lanceolate, pubescent. *Capsule* ⅔ in., stoutly clavate, pubescent, 4-seeded. *Seeds* ovoid, somewhat compressed, glabrous, densely rugose in nearly all herbarium specimens, but smooth in some fully ripened.

VAR. *villosa*; stem softly hairy, leaves hairy beneath, flowers salmon-coloured. J. Pseudo-Betonica, *Roth Nov. Sp.* 17.—Central India and Chota Nagpore, alt. 1–5000 ft, common.

VAR. *ramosissima*; stems decumbent diffuse, bracts rather narrower. J. ramosissima, *Roxb. Fl. Ind.* i. 129; *T. Anders. in Journ. Linn. Soc.* ix. 510. Adhatoda

ramosissima, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 385; *Dalz. & Gibs. Bomb. Fl.* 193.—Throughout India, frequent.—This plant is said to have both axillary and terminal spikes, while *J. Betonica* is said to have only terminal; but there is no difference in the inflorescence between them.

3. **J. nilgherrensis,** *Wall. Cat.* 2435; small procumbent nearly glabrous, leaves sessile oblong obtuse, spikes dense, bracteoles $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., corolla $\frac{1}{2}$–$\frac{3}{5}$ in. pale. J. neilgherriensis, *T. Anders. in Journ. Linn. Soc.* vii. 118. Adhatoda nilgherrensis, *Nees in Wall. Pl. As. Rar.* iii. 103. A. nilgherrica, *Nees in DC. Prodr.* xi. 386; *Wight Ic.* t. 1544.

NILGHERRIES, alt. 7–8000 ft.; plentiful in the grass round Ooty.

Rootstock woody. *Stems* 2–8 in., numerous. *Leaves* 1$\frac{1}{3}$ by $\frac{1}{3}$ in. *Spikes* terminal, $\frac{1}{2}$–2 in.; bracts $\frac{2}{3}$ by $\frac{1}{3}$ in., scarious-margined, very acute. *Capsule* $\frac{3}{5}$ in., stout, clavate, pubescent, 4-seeded. *Seeds* (not ripe) glabrous, subtubercular, rugose, not differing from those of some examples of *J. Betonica* at the same stage.—Seems distinct, but not allowed by T. Anderson (in *Thwaites Enum.* 233). Though the plant is so humble, the bracts, corolla and capsule are full as large as in *J. Betonica*.

4. **J. trinervia,** *Vahl Enum.* i. 156; small, procumbent, nearly glabrous, leaves ovate or elliptic, spikes lax continuous, bracteoles $\frac{1}{5}$ in. lanceolate, corolla $\frac{1}{3}$ in. *Wall. Cat.* 2446. J. Betonica, *T. Anders. in Journ. Linn. Soc.* ix. 509, *partly*. Adhatoda trinervia, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 386; *Dalz. & Gibs. Bomb. Fl.* 194.

W. DECCAN PENINSULA, in the Ghauts, frequent; Concan, *Stocks, Dalzell*; Canara, *Ritchie*; Nilgherries, *Wight*, &c.

Rootstock woody; stems 3–8 in. *Leaves* $\frac{1}{2}$–1 in., lower mostly short-petioled, upper sessile. *Spikes* 1–4 by $\frac{1}{2}$ in.; bracts $\frac{1}{5}$ by $\frac{1}{8}$ in., lanceolate, white or sometimes green, not or obscurely nervose.—This plant, "a small var. of *J. Betonica*" (T. Anders. ms.), differs considerably in the slender spikes and narrow bracts, as well as in size and habit, nor are there intermediates in the Herbarium.

VAR. *arenaria*; leaves linear-oblong, spikes often small. Adhatoda arenaria, *Nees in DC. Prodr.* xi. 387.—W. India; Concan, Belgaum, &c.

** *Bracts green, often purple-tinged, not white though sometimes scarious-margined.*

5. **J. ventricosa,** *Wall. Pl. As. Rar.* i. 80, t. 93, and *Cat.* 2436, and 7174 *in part*; leaves elliptic cuneate at both ends glabrous minutely lineolate, bracts orbicular imbricated usually 3-fld., bracteoles minute, corolla $\frac{3}{4}$ in. white rose-spotted. *Bot. Mag.* t. 2766; *T. Anders. in Journ. Linn. Soc.* ix. 509; *Kurz For. Fl.* ii. 248. Adhatoda ventricosa, *Nees in DC. Prodr.* xi. 407. Gendarussa ventricosa, *Nees in Wall. Pl. As. Rar.* iii. 104.

PEGU and TENASSERIM; *Wallich, M'Lelland*, &c.—DISTRIB. Siam, China (cultivated?).

Branches stout, glabrous. *Leaves* 6 by 2$\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. *Spikes* 3 by $\frac{3}{4}$ in., continuous, somewhat dense; peduncles 0–1 in., terminal, or terminal on short lateral branches; bracts $\frac{1}{3}$–$\frac{1}{2}$ in. diam., sub-4-ranked, puberulous. *Flowers* usually 3 in the axil of each bract subsessile; bracteoles $\frac{1}{8}$ in., subulate, or 0. *Calyx* $\frac{1}{6}$–$\frac{1}{5}$ in.; segments sublinear. *Capsule* $\frac{1}{2}$ in., hairy.

6. **J. oreophila,** *Clarke*; leaves broadly elliptic acute at both ends pubescent beneath, bracts orbicular imbricate 1-fld., bracteoles large spathulate-oblong.

CHITTAGONG Seetakoond alt. 1000 ft., *J. D. H.*

A shrub, habit of *J. ventricosa*; innovations densely silky strigose. *Leaves* $8\frac{1}{2}$ by $3\frac{1}{2}$ in., above minutely thinly hairy, nerves reticulate impressed, beneath pubescent especially on the nerves; petiole $\frac{3}{4}$ in. *Peduncles* 1–3 in., axillary; spikes 4 by 1 in., rachis softly hairy; bracts sub-4-ranked, $\frac{1}{2}$ by $\frac{1}{3}$ in., green, puberulous, 5-nerved; bracteoles $\frac{1}{2}$ by $\frac{1}{8}$ in., green. *Calyx* $\frac{1}{6}$ in., pubescent; segments linear-lanceolate.—Differs from *J. ventricosa* in the indumentum and bracteoles.

7. **J. punduana,** *Wall. Cat.* 2453; leaves broadly elliptic acute at both ends minutely lineolate nerves beneath villous, bracts ovate scarious-margined 1-fld., bracteoles oblong acute scarious longer than the calyx, corolla $\frac{1}{3}$ in. Rungia punduana, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 473; *T. Anders. in Journ. Linn. Soc.* ix. 518.

E. BENGAL; Jaintea Mts., *Gomez*; Cachar, *Keenan*.

A shrub; stem rooting; annual branches 1 foot, villous-pubescent. *Leaves* 6 by $2–2\frac{3}{4}$ in.; petiole $\frac{1}{4}$ in. *Spikes* axillary and terminal, $1\frac{1}{2}$ by $\frac{1}{2}$ in., dense; peduncles $\frac{1}{4}$ in.; bracts closely imbricate, imperfectly 4-ranked, $\frac{1}{2}$ by $\frac{1}{3}$ in., obtuse or subacute; bracteoles $\frac{1}{4}$ in., minutely hairy. *Sepals* $\frac{1}{5}$ in., equal, linear-lanceolate, minutely hairy. *Anther-cells* minutely hairy, lower distinctly white-tailed. *Capsule* scarcely $\frac{1}{3}$ in., pubescent, clavate, 4-seeded; pedicel solid, placentæ not rising elastically from the capsule-base. *Seeds* glabrous, rugose, subtubercular.—Very few of the plants marked Pundua by Wallich were collected at or near Pundua; the present species was collected by Gomez (Wallich's trained Eurasian collector), and delivered to Wallich in his boat at Pundua. It is strange that Nees and T. Anderson should have removed this species to *Rungia*; for it is a shrub resembling *J. Atkinsoni*, &c.

8. **J. burmanica,** *Clarke*; leaves long-petioled broadly elliptic acute at both ends villous on the nerves beneath, bracts obovate or orbicular nearly glabrous 1-fld., bracteoles broadly lanceolate longer than the calyx.

BURMA; *Griffith* (Kew Distrib. n. 6184).

Resembling very much *J. Keenani*, but the leaves are long-petioled, the bracts herbaceous, uniformly intensely green (even when dried) without a scarious margin. *Spikes* 2–5 in., continuous but lax; bracts sometimes scarcely imbricate, subpatent. *Corolla* not seen. *Capsule* $\frac{1}{2}$ in., 4-seeded, glabrous or puberulous.

9. **J. argyrostachya,** *T. Anders. in Journ. Linn. Soc.* ix. 510; leaves large ovate minutely pubescent, bracts ovate patently softly long-hairy 1-fld., bracteoles falcate-oblong longer than the calyx, corolla $\frac{1}{2}$ in. Adhatoda argyrostachya, *Nees in Wall. Pl. As. Rar.* iii. 1027, and *Cat.* 7172, and in *DC. Prodr.* xi. 385.

BURMA; Prome Hills, *Wallich*.

An undershrub (or large herb) with the habit of the preceding species. *Leaves* 11 by 5 in., shortly attenuate at both ends; petiole $1\frac{1}{2}$ in. *Spikes* axillary, solitary and terminal, 2–5 by 1 in., continuous; peduncles short; bracts $\frac{1}{2}–\frac{2}{3}$ by $\frac{1}{3}$ in., imbricate, green purple-margined; bracteoles $\frac{1}{4}–\frac{1}{3}$ in. *Sepals* 5, $\frac{1}{4}$ in., linear-lanceolate. *Corolla* (fide Nees) yellowish-white purple-marked. *Capsule* $\frac{1}{3}$ in., clavate, 4-seeded.—This differs from the allied species (except *J. Kurzii*) by the long soft hairs on the bracts.

10. **J. Kurzii,** *Clarke*; leaves large ovate minutely pubescent, bracts large elliptic acute softly long-hairy 1-fld., bracteoles sublinear longer than the calyx, corolla nearly 1 in.

PEGU; *Kurz*.

A large herb, closely resembling *J. argyrostachya* except as to the corolla. *Leaves* 7 by $4\frac{1}{2}$ in., acute, base suddenly attenuate; petiole $2\frac{1}{2}$ in. *Spikes* 3–4 in.; bracts $\frac{3}{4}$ by $\frac{1}{4}$ in., sub-4-ranked; bracteoles $\frac{1}{3}–\frac{1}{2}$ in., hairy. *Calyx-segments* $\frac{1}{4}–\frac{1}{3}$ in., linear-

setaceous hairy. *Corolla* (dried) rose-purple, spotted; tube much inflated upwards. Lower *anther-cell* conspicuously white-tailed.—A specimen, issued by Kurz under the same number (2167), has large oblong leaves much attenuate at both ends; petiole winged to the base, and there often auriculate; capsules 1/3 in., clavate, 4-seeded. From the variations of the leaves in some allied species, it is probably a form of *J. Kurzii.*

11. **J. Atkinsoni,** *T. Anders. in Journ. Linn. Soc.* ix. 509; leaves long-petioled ovate caudate-acuminate puberulous on the nerves beneath, bracts suborbicular pubescent 1-fld., bracteoles linear nearly as long as the bracts, corolla 1/2 in.

SIKKIM and E. BHOTAN, alt. 2–6000 ft., from the outer hills to the northern valleys frequent, *T. Anderson*, &c.

A shrub, 2–3 ft. *Leaves* 8 by 4½ in. (many smaller narrower), base shortly decurrent; petiole 3 in. *Spikes* terminal, solitary, 2–5 by 3/4 in., continuous; peduncles 1/2–2 in.; bracts 1/3–1/2 in., green, purple-margined; bracteoles 1/3 in., green. *Sepals* 5, 1/4–1/3 in., linear, puberulous. *Corolla* hairy without, yellowish-white rose-marked. *Stamens* and *pistil* glabrous; lower anther-cell distinctly white-tailed *Capsule* 1/3 in., clavate, 4-seeded. *Seeds* glabrous, rugose, subtubercular.

12. **J. grandifolia,** *T. Anders. in Journ. Linn. Soc.* ix. 510; leaves long-petioled large round-ovate nearly glabrous, bracts elliptic acute rusty pubescent 1-fld., bracteoles 1/2 in. linear-lanceolate hairy, corolla 3/4–1 in.

MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

A herb (T. Anders.). *Leaves* 8–5 in., attaining 14 by 7 in. (T. Anders.), shortly acuminate, base rounded or very shortly decurrent; petiole 3½ in. *Spikes* axillary and terminal, 3–11 by 1 in., continuous, somewhat lax, very pubescent; peduncles 0–1 in.; bracts 3/4–1 by 1/3 in. *Sepals* 5, 1/3 in., linear-lanceolate, very pubescent. *Corolla* 3/4–1 in., pubescent, white purple-marked. *Anther-cells* glabrous, subparallel, lower minutely white-tailed. *Capsule* 1/2 in., stoutly clavate, pubescent, 4-seeded.

13. **J. dasycarpa,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; leaves ovate acute subglabrous, bracts ovate softly hairy, bracteoles oblong longer than the calyx, corolla 1/3 in. Neuracanthus tetragonostachyus, *Wall. Cat.* 7168, *by admixture.*

TENASSERIM; Chappedong, *Wallich.* RANGOON; *M'Lelland.* KAREN HILLS, *Kurz.*

Stem 1½–3 ft., glabrous, pubescent upwards. *Leaves* 3 by 2 in., base obtuse, raphides conspicuous on both surfaces; petiole 1/2 in., pubescent. *Spikes* axillary and terminal, 1/2–1½ by 1/3 in., continuous; peduncles 1/8 in.; bracts 1/4 in., green; bracteoles 1/6 in. *Calyx* 1/8 in.; segments 5, linear-lanceolate, pubescent. Lower *anther-cell* shortly white-tailed. *Capsule* 1/3 in., clavate, pubescent, 4-seeded.—The bracts are 1–3-fld.; where several flowers occur, some of the bracteoles are suppressed. The leaves, bracts and flowers are considerably smaller than in the preceding species.

14. **J. fragilis,** *Wall. Cat.* 7174, *type sheet only*; leaves oblong narrowed at both ends glabrous, bracts elliptic acute puberulous several-fld., bracteoles small linear or 0, corolla 2/3 in.—Justicia sp., *Griff. Notul.* iv. 143.

TENASSERIM; Amherst, *Wallich*; Mergui, *Griffith.*

Branch elongate, glabrous. *Leaf* 5 by 1¼ in.; petiole 1/3 in. *Spikes* 1–5 in., terminal and quasi-axillary on short-lateral branches, interrupted below; bracts 1/3 by 1/6 in., uniformly green, somewhat deciduous, upper imbricate; flowers clustered on the spikes; bracteoles 0–1/8 in. *Sepals* 5, 1/8–1/6 in., linear, puberulous. *Corolla* pubescent, altogether as of Sect. Betonica. *Stamens* and *pistil* very nearly glabrous; lower anther-cell distinctly shortly white-tailed.—The elongate spikes interrupted below

and deciduous bracts are very unlike *J. ventricosa*, with which Nees united this, and which has been distributed by Wallich under the same number.

15. **J. caloneura,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; leaves elliptic acute at both ends minutely pubescent, bracts ovate acuminate pubescent, bracteoles broadly lanceolate exceeding the calyx, corolla $\frac{1}{3}$–$\frac{1}{2}$ in.

TENASSERIM; *Beddome.*

A perennial herb; stems 2–3 ft., glabrous or crisped-pubescent. *Leaves* 4 by 1$\frac{1}{2}$ in., nerves conspicuously reticulate on both surfaces; petiole 0–$\frac{1}{2}$ in., crisped-pubescent. *Spikes* terminal, 1$\frac{1}{3}$ by $\frac{1}{3}$ in., dense; peduncles $\frac{1}{4}$ in.; bracts $\frac{1}{4}$ by $\frac{1}{6}$ in., 4-ranked, striate, green black-tipped, ciliate; bracteoles $\frac{1}{5}$ by $\frac{1}{8}$ in., green. *Sepals* 5, $\frac{1}{6}$ in., linear, pubescent. *Corolla* minutely hairy, straw-coloured (Kurz). *Anther-cell* distinctly white-tailed. *Capsule* not seen.—Identified with Kurz's *J. caloneura* from description only.

16. **J. ceylanica,** *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 513; leaves lanceolate or ovate-lanceolate glabrous, bracts and bracteoles spathulate orbicular, corolla $\frac{1}{3}$ in. Adhatoda ceylanica, *Nees in DC. Prodr.* xi. 400.

CEYLON; *Walker, Gardner,* &c.

Herbaceous, 2–3 ft., branched, glabrous; whole plant, including the bracts, drying black. *Leaves* 3 by 1 in., acuminate, not or very obscurely lineolate, base cuneate, midrib beneath glabrous; petiole $\frac{1}{8}$ in. *Spikes* axillary, branched, lax, nearly glabrous; bracts $\frac{1}{8}$ in., orbicular, on a $\frac{1}{8}$ in. pedicel, patent; bracteoles similar, but rather smaller; flowers in distant opposite pairs. *Calyx-segments* 5, $\frac{1}{8}$ in., linear, nearly glabrous. *Corolla* nearly glabrous, purple (fide Nees); lower lip longer. *Capsule* $\frac{1}{3}$ in., clavate, puberulous, 4-seeded.

VAR. *viridescens*; leaves larger pubescent on the nerves beneath, bracts larger obovate, bracteoles oblong.—Ceylon; *Walker, Thwaites,* C. P. n. 2422, *partly.*—Whole plant drying green. *Leaves* 5 by 2 in., conspicuously lineolate on both surfaces. *Spikes* 2–4 in., much interrupted; bracts $\frac{1}{3}$ by $\frac{1}{4}$ in., green, nearly glabrous; bracteoles $\frac{1}{4}$ in. *Calyx-segments* $\frac{1}{4}$–$\frac{1}{3}$ in., green, lineolate. *Capsule* as of type.—Very unlike *J. ceylanica,* of which both Nees and T. Anderson consider it a form.

VAR. *capitata,* T. Anders. ms.; leaves pubescent, spikes capitate globose solitary on short axillary peduncles.—Ceylon; *Thwaites,* n. 3919, and 2422 *partly.*—*Branches* pubescent. *Leaves* subhispidly pubescent on both surfaces, drying green. *Peduncles* $\frac{1}{4}$ in.; heads $\frac{2}{3}$ in. diam., rusty pubescent; bracts densely imbricate. *Calyx-segments* $\frac{1}{3}$ in., oblong-lanceolate, subscarious. *Corolla* and *stamens* as of *J. ceylanica. Capsule* not seen.—A very puzzling plant, not seen by Nees; Mr. Bentham observes that it is "very near Sect. Anisostachya."

17. **J. glauca,** *Rottler*; *Roem. & Sch. Syst.* i. 165; herbaceous, leaves 1–2 in. ovate puberulous or pubescent, bracts ovate or orbicular puberulous ciliate or pubescent, corolla $\frac{1}{3}$ in. J. brachiides, *Roth Nov. Sp.* 16. J. orixensis, *Roxb. Fl. Ind.* i. 132; *T. Anders. in Journ. Linn. Soc.* ix. 510, *partly.* J. tranquebariensis, *Roxb. l. c.* 130; *Wall. Cat.* 2424 (*not* 2462); *T. Anders. l. c.* 513, *partly*; *not of Linn. f.* J. brachionoides, *Spreng. Syst.* i. 82. Gendarussa orixensis, *Nees in Wall. Pl. As. Rar.* iii. 104. Adhatoda orixensis & diversiformis, *Nees in DC. Prodr.* xi. 400, 399.

DECCAN PENINSULA, alt. 0–2000 ft., frequent; *Rottler,* &c.

Stems 8–20 in., herbaceous, puberulous, diffuse; internodes long. *Leaves* pubescent on the nerves beneath, those at the main nodes acute at both ends, many smaller often rounded leaves on the lateral branches; petiole $\frac{1}{3}$ in. *Spikes* 1–5 by $\frac{1}{2}$ in., terminal, lax; solitary bractless flowers often scattered in the distant lower axils; bracts $\frac{1}{4}$ in. diam., often subpatent, very variable in indumentum; bracteoles $\frac{1}{8}$ in., obovate-oblong, or often 0. *Sepals* $\frac{1}{8}$–$\frac{1}{5}$ in., linear, pubescent or glabrous. *Capsule* $\frac{1}{4}$ in., nearly glabrous, short-stalked, 4-seeded. *Seeds* hispid with ovate acute scales.—Perhaps not

distinct from the next. T. Anderson regards the presence of scattered solitary flowers in the lower axils as of specific importance, and has deviated from the results of the older botanists accordingly.

18. **J. tranquebariensis,** *Linn. f. Suppl.* 85; very woody, leaves $\frac{1}{6}$–$\frac{1}{2}$ in. orbicular or obovate puberulous or pubescent, bracts ovate or orbicular puberulous or pubescent, corolla $\frac{1}{3}$ in. *Wall. Cat.* 2462; *T. Anders. in Journ. Linn. Soc.* ix. 513, *partly.* Gendarussa tranquebariensis, *Nees in Wall. Pl. As. Rar.* iii. 105; *Wight Ill.* t. 164 b, fig. 8, and *Ic.* t. 462. Adhatoda tranquebariensis, *Nees in DC. Prodr.* xi. 399.

S. MADRAS and CEYLON, especially on hot dry low hills, frequent; *Wight*, &c.

A low, intricate undershrub; nodes very short. Inflorescence, corolla, capsule and seeds as of *J. glauca.*—Wight's figure represents a more diffuse plant with leaves considerably larger than in any of the specimens; it is a form intermediate between *J. glauca* & *tranquebariensis* as here understood; Col. Beddome believes these two not specifically distinct.

19. **J. salsoloides,** *T. Anders. in Journ. Linn. Soc.* ix. 514; branches softly white-hairy, leaves small spathulate or oblong subglabrous, bracts elliptic or oblong, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. densely white-hairy.

CARNATIC and MYSORE; *Wight*, *G. Thomson.*

A rigid, much-branched, small undershrub; branches densely shortly hairy. *Leaves* sessile, $\frac{1}{2}$–$\frac{3}{4}$ in., obtuse. *Spikes* terminal, few-fld., with scattered solitary, often ebracteate flowers in the axils below; bracts $\frac{1}{4}$ by $\frac{1}{8}$ in.; bracteoles similar, smaller, or often 0. *Sepals* $\frac{1}{8}$ in., linear-lanceolate, pubescent. Lower *anther-cell* tailed. *Capsule* $\frac{1}{3}$ in., clavate, densely pubescent (T. Anderson).—Easily separated from *J. trinervis* (and its Var. *arenaria*) by the white-furred branches and narrower non-marginate bracts.

Sect. 3. **Calophanoides.** *Flowers* axillary, solitary clustered or in dense cymes, without a terminal spike or panicle. *Calyx* sub-5-partite. *Corolla* small. *Seeds* subtubercular or verrucose, not hispid.

* *Bracts obovate or spathulate* (all perhaps var. of one).

20. **J. quadrifaria,** *Wall. Cat.* 2479; leaves shortly petioled elliptic acute at both ends puberulous on the nerves beneath, flowers in close axillary clusters, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 514, *partly.* Gendarussa quadrifaria, *Nees in Wall. Pl. As. Rar.* iii. 105. Adhatoda quadrifaria, *Nees in DC. Prodr.* xi. 396.

KHASIA and JAINTEA MTS., alt. 3000 ft.; *Wallich*, &c. ASSAM; *Griffith* (Kew Distrib. n. 6188).—DISTRIB. S. China.

Branches 2 ft., little divided, rusty-pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., drying black, not or obscurely lineolate; petiole $\frac{1}{3}$ in. *Flowers* 1–5-nate; bracts $\frac{1}{4}$ in., spathulate, orbicular or emarginate, very rusty-pubescent; bracteoles similar, smaller, or 0. *Sepals* $\frac{1}{4}$ in. and upwards, linear-lanceolate, lineolate, puberulous. *Corolla* hairy, white rose-spotted. Lower *anther-cell* white-tailed. *Capsule* $\frac{1}{4}$ in., minutely pubescent, 4-seeded; solid pedicel very short. *Seeds* tubercular, verrucose, glabrous.

21. **J. Zollingeriana,** *Clarke*; leaves shortly petioled oblong acuminate at both ends nearly glabrous, flowers in close axillary clusters, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. J. quadrifaria, *T. Anders. in Journ. Linn. Soc.* ix. 514, *partly.* Adhatoda Zollingeriana, *Nees in DC. Prodr.* xi. 396.

TENASSERIM; *Beddome.*—DISTRIB. Java.

Resembling *J. quadrifaria*, but much more glabrous. *Branches* minutely pubes-

cent. *Leaves* 4 by 1 in.; nerves conspicuous. *Bracts* ⅓ in., spathulate, orbicular, subglabrous. *Corolla* subglabrous.

22. **J. salicifolia,** *T. Anders. in Journ. Linn. Soc.* ix. 514; leaves subpetioled lanceolate acuminate at both ends glabrous or pubescent, flowers in close axillary clusters, corolla ⅓ in. minutely hairy.—Adhatoda sp. n. 20, *Herb. Ind. Or. H. f. & T.*

N. KHASIA MTS., alt. 3–5000 ft.; Borpani and Shillong, *H. f. & T.*, &c.

Leaves 2½ by ½ in.; petiole 1/12 in. *Bracts* ¼ in., spathulate, orbicular, glabrous or sparsely pubescent.

23. **J. Neesiana,** *Wall.*; *T. Anders. in Journ. Linn. Soc.* ix. 513; leaves linear-lanceolate glabrous, flowers in close axillary clusters, corolla ¼ in. Gendarussa Neesiana, *Wall. Cat.* 7175; *Nees in Wall. Pl. As. Rar.* iii. 105. Adhatoda Neesiana, *Nees in DC. Prodr.* xi. 397.

KHASIA MTS.; *Wallich.*

A small undershrub; internodes very short. *Leaves* 1½ by ¼ in.; petiole hardly any. *Bracts* as in the 3 preceding species, which differ from the present by their diffuse habit and elongate internodes.

** *Bracts lanceolate or linear-lanceolate.*

24. **J. flava,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 97; subglabrous, leaves ovate or ovate acuminate; cymes small axillary densely subcapitate subglabrous, corolla ⅓–½ in. pubescent yellow.

TENASSERIM; *Beddome*; Martaban (fide Kurz).

A herb, 2–3 ft., erect (*Kurz*). *Leaves* 4–6 in., acuminate at both ends, nerves prominent; petiole ¾ in. *Cymes* forming axillary heads 1¼ in. diam.; bracts and bracteoles small, linear, glabrous. *Sepals* 5, ¼–⅓ in., linear-lanceolate, caudate, glabrous. Lower *anther-cell* distinctly white-tailed. *Capsule* ½ in., clavate, glabrous, 4-seeded; seeds minutely rugulose (*Kurz*).—No specimen of Kurz's plant has been seen, but his description fits very satisfactorily Beddome's Herb. Propr. n. 84.

25. **J. Brandisii,** *T. Anders. in Journ. Linn. Soc.* ix. 514; leaves ovate acute pubescent on the nerves beneath, flowers sessile or sometimes aggregated on a very short peduncle, corolla pubescent tube short.

BURMA; Mt. Toungoo, *Brandis*, and Karen Hills, *Masson* (fide T. Anderson).

An undershrub, 1–2 ft.; stem terete, glabrous. *Leaves* scabrous above, puberulous beneath, decurrent into the petiole; nerves prominent, approximate. *Bracts* and *bracteoles* small, subulate. *Sepals* 5, equal, ⅛ in., subulate, hoary pubescent. Lower *anther-cell* long-tailed. *Ovary* 4-ovulate (T. Anderson).—Not seen. Anderson places it in a section with "flowers axillary solitary or 2 or 3 together," along with *J. salicifolia* & *quadrifaria*. Nevertheless it may be *J. flaccida*, Kurz, of the Section *Gendarussa*.

26. **J. heterocarpa,** *T. Anders. in Journ. Linn. Soc.* vii. 41; leaves petioled ovate minutely lineolate subglabrous, flowers minute in small axillary clusters, capsules of 2 kinds in nearly every axil, abnormal winged crested 1-seeded. Harnieria dimorphocarpa, *Solms in Schweinf. Æthiop.* 110.

WESTERN INDIA; Deesa (Goojerat) and Kurrachee (Scinde), *Stocks*; Ferozepore (Punjab), *Vicary*.—DISTRIB. Abyssinia.

A herb, 8–12 in., minutely grey-pubescent. *Leaves* 1 by ½ in.; petiole ⅓ in. *Flowers* 1–4-nate, closely axillary; bracts and bracteoles small, linear. *Calyx* sub-5-partite; segments ⅛ in., linear, minutely pubescent. *Corolla* ⅓ in., upper lip shortly 2-lobed, lower transversely marked shortly 3-lobed. *Anther-cells* ovate; lower white-tailed.

Normal *capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., ellipsoid, acute at each end, hardly stalked, pubescent, 4-seeded. *Seeds* papillose, subhispid; abnormal 1-celled, 1-seeded capsules occur $\frac{1}{8}$ in., ellipsoid with 3–6 vertical crested wings, with seed ovoid, larger than in the normal, nearly smooth, on a nearly basal retinaculum.—The examples collected far apart show the heterocarpous capsules to be characteristic, not monstrous. The species is not nearly allied to any other; but as the inflorescence is axillary and the calyx 5-merous, it has been moved here so as to fortify the characters of the Section *Rostellaria.*

Sect. 4. **Gendarussa.** *Spikes* terminal and on short lateral branches (in *J. Hookeriana* axillary), interrupted; terminal often large, paniculate; bracts mostly narrow, lower rarely imbricate. *Calyx* sub-5-partite. *Flowers* small or middle-sized. *Seeds* (where known) verrucose or tubercular, glabrous, not glochidiate nor hispid.

27. **J. Gendarussa,** *Linn. f. Suppl.* 85; leaves short-petioled lanceolate glabrous, spikes puberulous or glabrous, bracts linear shorter than the calyx, corolla $\frac{1}{2}$ in. *Jacq. Ecl.* t. 11; *Burm. Fl. Ind.* 10; *Roxb. Fl. Ind* i. 128; *Blume Bijd.* 785; *Wall. Cat.* 2442; *Bot. Reg.* t. 635; *Blanco Fl. Fil.* 14; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71; *T. Anders. in Journ. Linn. Soc.* ix. 513; *Kurz For. Fl.* ii. 247. Gendarussa vulgaris, *Nees in Wall. Pl. As. Rar.* iii. 104, and in *DC. Prodr.* xi. 410; *Wight Ic.* t. 468; *Decne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 382.—*Rumph. Herb. Amb.* iv. t. 28. *Rheede Hort. Mal.* ix. t. 42.

Throughout INDIA, from Bengal to Ceylon and Malacca, often an escape from cultivation.—DISTRIB. Malaya and China to the Philippines (? wild).

Stems 2–4 ft., erect. *Leaves* 4 by $\frac{3}{4}$ in.; petiole $\frac{1}{4}$ in. *Spikes* 2–5 by $\frac{3}{4}$ in., terminal often forming a panicle; flowers clustered, lower clusters usually distant; bracts $\frac{1}{8}$ in. *Sepals* $\frac{1}{6}$ in. *Corolla* nearly glabrous, white or rose with purple spots. Lower *anther-cell* distinctly tailed. *Capsule* $\frac{1}{2}$ in., clavate, glabrous, 4-seeded.—No capsule has been seen except on an example of Wight's; and that does not suffice for a description of the seed. This commonly cultivated plant is considered by Nees and T. Anderson wild in various parts of India, but the rarity of the seeds renders this doubtful. Col. Beddome says " wild on Mooleyit in Tenasserim."

28. **J. Hookeriana,** *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 513; leaves short petioled lanceolate glabrous, spikes simple or compound all axillary lax nearly glabrous, bracts linear or linear-spathulate mostly shorter than the calyx, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 268. Adhatoda Hookeriana, *Nees in DC. Prodr.* xi. 403. Leptostachya zeylanica, *Nees l. c.* 379.

CEYLON; *Macrae, Walker,* &c.

An undershrub, less erect, more branched than *J. Gendarussa. Leaves* as of *J. Gendarussa. Spikes* 2–7 in., simple or paniculate; flowers distant, solitary or opposite; bracts $\frac{1}{8}$ in., linear, rarely spathulate; bracteoles $\frac{1}{8}$ in., linear, or 0. *Flowers* nearly as of *J. Gendarussa. Capsule* $\frac{1}{3}$ in., clavate, 4-seeded. *Seeds* verrucose, glabrous.—Beddome figures the inflorescence terminal, but in the examples the uppermost axils are sterile, many lower axils with spikes.

29. **J. decussata,** *Roxb. Hort. Beng.* 4, and *Fl. Ind. ed. Carey & Wall.* i. 128; leaves ovate or obovate pubescent or glabrate, panicle terminal large divaricate pubescent, flowers in distant clusters, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. pubescent. *Wall. Cat.* 2476; *T. Anders. in Journ. Linn. Soc.* ix. 515. Gendarussa decussata, *Nees in Wall. Pl. As. Rar.* iii. 104. Adhatoda decussata, *Nees in DC. Prodr.* xi. 408.

PEGU and TENASSERIM, frequent; *Wallich, Griffith,* &c.

A shrub, 3–6 ft.; branches pubescent upwards. *Leaves* (upper cauline alone seen) 6–10 by 3–6 in., petioled ovate, or sessile spathulate-obovate, base auricled, punctulate, puberulous at least when young. *Panicles* 12–20 in. long and broad; branches long, subsimple, often recurved in fruit; clusters 2–8-fld., pubescent, lower often 1–3 in. apart; bracts 1/8 in., linear-lanceolate, but the clusters are often supported by reduced leaves 1/2–1 in.; bracteoles 1/8 in., linear, often 0. *Sepals* 1/8–1/6 in., linear-lanceolate, pubescent. Lower *anther-cell* distinctly white-tailed. *Capsule* 2/3 in., long-stalked, pubescent, 4-seeded. *Seeds* verrucose, glabrous.

30. **J. Helferi,** *Clarke*; leaves petioled elliptic acute at both ends glabrous, panicle terminal of 3 erect spikes, clusters of flowers distant pubescent, corolla 1/3 in. pubescent.

TENASSERIM or ANDAMANS; *Helfer* (Kew Distrib. n. 6185).

Branch woody, terete, glabrous. Upper *leaves* 5 1/2 by 2 in., minutely lineolate on both surfaces; petiole 1/2 in. *Panicle* 3 in. diam., trichotomous, sparingly pubescent; lateral spikes curved, ascending; bracts 1/8–1/6 in., linear-lanceolate, pubescent. *Calyx* and *corolla* as of *J. decussata*, but rather smaller.—This may be a small var. of *J. decussata*, as the example is poor; but the leaves do not match, and the curved ascending spikes are very unlike the habit of *J. decussata*.

31. **J. flaccida,** *Kurz in Journ. As. Soc.* 1870, ii. 80, and in *Flora* 1870, 364; leaves large sessile spathulate-elliptic nearly glabrous, panicles terminal very lax, flowers distant rarely clustered, corolla 2/3 in. nearly glabrous pale yellow or testaceous (Kurz).—Adhatoda n. 19, *Herb. Ind. Or. H.f. & T.*

PEGU; *M'Lelland, Kurz, Brandis.*

Annual, 1–2 ft., erect. *Leaves* opposite and ternate, 7–12 in., acuminate, lineolate above; petiole winged to the base, there often auriculate. *Panicle* often 12 in. long and broad, very thin flaccid, nearly glabrous; flowers opposite or alternate, lower often 1 in. apart; bracts hardly 1/8 in., linear-lanceolate. *Sepals* 1/8 in., linear-lanceolate, puberulous or glabrate. *Corolla* slender. Lower *anther-cell* white-tailed. *Capsule* 2/3 in., long-stalked, thinly pubescent, 4-seeded.

32. **J. wynaadensis,** *Wall. Cat.* 2474; leaves petioled elliptic acuminate at both ends pubescent or glabrous, spikes simple or compound axillary and terminal pubescent interrupted, flowers solitary opposite, bracts linear-lanceolate shorter than the calyx, corolla 1/3–1/2 in. *T. Anders. in Journ. Linn. Soc.* ix. 515. J. lineata, *Wall. Cat.* 2486, *second sheet.* Gendarussa wynaadensis, *Nees in Wall. Pl. As. Rar.* iii. 104. Adhatoda wynaadensis, *Nees in DC. Prodr.* xi. 406; *Dalz. & Gibs. Bomb. Fl.* 194; *Wight Ic.* t. 1545.

S. DECCAN PENINSULA, alt. 1–3000 ft.; Wynaad, Belgaum, Coorg, &c., *Wight, Ritchie*, &c.

Branches elongate, terete, glabrescent; internodes long. *Leaves* 4 1/2 by 2 in., pubescent beneath or glabrous; petiole 3/4 in. *Spikes* 2–4 in., somewhat dense in flower, elongate interrupted in fruit; bracts 1/8–1/6 in.; bracteoles 1/8 in., linear. *Sepals* 1/6 in., linear, very pubescent. *Corolla* pubescent, purple. Lower *anther-cell* white-tailed. *Capsule* 1/2–2/3 in., very pubescent, clavate, 4-seeded. *Seeds* verrucose, glabrous. —Very variable in indumentum; Wight's type, from the Nilgherries' base, has the leaves very pubescent beneath, and has been marked *Rhaphidospora* sp. by T. Anderson. Dalzell's specimens have the leaves glabrous beneath.

33. **J. vasculosa,** *Wall. Cat.* 2469; leaves ovate attenuate at both ends minutely crisped pubescent on the midrib beneath, flowers solitary opposite, corolla 1/3–1/2 in. upper lip oblong entire lower pendent. *T. Anders. in Journ. Linn. Soc.* ix. 515. Ruellia rivinæfolia, *Wall. Cat.* 2413. Gen-

darussa vasculosa, *Nees in Wall. Pl. As. Rar.* iii. 104. Adhatoda vasculosa, *Nees in DC. Prodr.* xi. 407.

E. HIMALAYA and KHASIA MTS., alt. 2–5000 ft., common; *Wallich, H.f. & T.*, &c.

Rootstock perennial; branches 8–20 in., glabrous except at the tip. *Leaves* 5 by 2 in., puncticulate above; petiole ¾ in. *Spikes* 1–4 in., axillary and terminal, simple or paniculate, pubescent; bracts oblong or linear, mostly shorter than the calyx, pubescent; bracteoles similar to the bracts, but smaller. *Calyx* sub-5-partite; segments ⅙ in., lanceolate. *Corolla* pubescent, yellowish slightly pink-spotted; tube cylindric; upper lip hardly broader than one of the three lobes of the lower. *Anther-cells* divaricate, lower with a minute white appendage at the base. *Ovary* glabrous; style pubescent in the lower part. *Capsule* not seen, the abundant specimens all being in flower.—T. Anderson places this in *Raphidospora,* and in the absence of the seed it is impossible to prove he is wrong; but in the Sect. *Raphidospora,* the flowers are "laxly panicled," as T. Anderson says.

VAR.? *Parishii*; leaves glabrous, upper lip of corolla ovate ⅓ in. broad lower erect-patent.—Moulmein; *Parish,* n. 417. Tenasserim, Mooleyit; *Beddome,* n. 86. —This may be specifically distinct.

VAR. *Brandisii*; bracts (even in the upper part of the spikes) exceeding ¼ in. elliptic-acuminate.—Pegu; Sitang, *Brandis.*—*Capsule* ½ in., narrowly cylindric, clavate, very hairy. *Seeds* roughly verrucose, glabrous.

34. **J. andrographioides,** *Clarke*; leaves ovate acuminate glabrous base rhomboid or rounded, flowers solitary opposite, corolla ½ in. both lips erect-patent.

TENASSERIM; Mooleyit, *Beddome.*

Closely resembling *J. vasculosa,* both in leaves and inflorescence, but the corolla as of *Andrographis.* *Leaves* 3 by 1 in. *Spikes* (all seen) solitary, terminal, simple, pubescent; bracts small linear, or the lower ⅙ in., linear-spathulate. Lower *anther-cell* with a microscopically small white spur.

35. **J. ptychostoma,** *Wall. Cat.* 2478; leaves ovate acuminate at both ends minutely pubescent on the nerves beneath, spikes axillary linear dense nearly glabrous, bracts minute, corolla ¼–⅓ in. *T. Anders. in Journ. Linn. Soc.* ix. 517? Gendarussa? sumatrana, *Miq. Fl. Ind. Bat.* ii. 832.

PENANG; *Wallich.*—DISTRIB. Sumatra.

Wallich's imperfect example is perhaps the same as *J. vasculosa* var. *Parishii* above. *Branches* slender, with long internodes, glabrous. *Leaves* 6 by 2½ in., nearly glabrous, closely lineolate above; petiole 1½ in. *Spikes* 3½ by ¼ in., those seen all axillary, but there may have been also terminal spikes; bracts $\frac{1}{20}$ in., ovate or lanceolate; bracteoles $\frac{1}{10}$ in., linear-lanceolate. *Sepals* ⅛ in.—J. ptychostoma, *Nees in Wall. Pl. As. Rar.* iii. 108 (Rhytiglossa? ptychostoma, *Nees in DC. Prodr.* xi. 337), is founded on this Wallichian number, but the description of the bracts is so different from the example that there must have been some confusion.

36. **J. Maingayi,** *Clarke*; leaves ovate-lanceolate or narrowly lanceolate minutely pubescent on both surfaces, flowers solitary mostly alternate, corolla ⅓ in.

PENANG; *Maingay* (Kew Distrib. n. 1181).

A small shrub (Maingay); branches elongate, slender, glabrous except at the tips. *Leaves* 4 by ⅓–1 in., very variable in breadth on the same branch, base cuneate; petiole ⅛ in. *Spikes* axillary and terminal, simple or divided, 2–3 in., slender, lax, pubescent; lower flowers distant, mostly alternate; bracts ⅙ in., linear-lanceolate, pubescent. *Calyx* and *corolla* nearly as of *J. vasculosa,* but upper corolla-lip ovate, broader. *Capsule* ⅓ in., stalk solidified.—The line between the small *Justicias* of this section and *Dianthera* is artificial, and the present species has quite the habit of others which have been removed by Bentham (in Herb. Kew) to *Dianthera.* It is

retained in *Justicia* because the white tail of the lower anther-cell, though small, is yet larger than in *J. vasculosa*, a species retained by name in *Justicia* by Bentham. —These small Justicias (*J. vasculosa, Maingayi*, &c.) form with *Dianthera collina*, &c., a very natural group; but they cannot be kept together unless we pull the Acanthaceæ all to pieces, and abolish anther-tails from the generic characters (which will be done some day).

37. **J. flagelliformis,** *Clarke*; leaves ovate attenuate at both ends minutely crisped pubescent on the midrib beneath, spikes linear, bracts and bracteoles lanceolate longer than the calyx, corolla $\frac{1}{3}$ in.

TENASSERIM or ANDAMANS; *Helfer* (Kew Distrib. n. 6172).

Branches elongate slender, glabrous except at the tips. *Leaves* 5 by 2 in., puncticulate above; petiole $\frac{2}{3}$ in. or frequently 0. *Spikes* 1–3, terminal, 3–5 by $\frac{1}{4}$ in., wavy, subinterrupted below; bracts $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{10}$ in., green, minutely pubescent; bracteoles nearly as long, narrower, subfalcate. *Calyx* sub-5-partite; segments $\frac{1}{6}$ in., linear pubescent. *Corolla* nearly as of *J. vasculosa*; upper lip ovate subentire. Lower *anther-cell* white-tailed. *Capsule* $\frac{1}{2}$ in., clavate.—The leaves closely resemble those of *J. vasculosa*, but the narrow subimbricate bracts are altogether different.

38. **J. grossa,** *Clarke*; leaves petioled large ovate glabrous, spikes terminal solitary linear pubescent, bracts elliptic or oblong often as long as the calyx, corolla $\frac{1}{3}$ in.

MERGUI; *Griffith.*

Branches glabrous, with numerous large leaves near the tips. *Leaves* 8–10 by 4 in., acute, base rhomboid or obtuse; petiole 1 in. *Spike* 5 in., subsessile, interrupted below; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., puberulous. *Sepals* $\frac{1}{8}$ in., linear-lanceolate. *Anther-cells* subparallel, slightly divaricate at the base, one somewhat lower, both white-tailed at the base. *Ovary* glabrous, 4-ovulate; style minutely hairy below; stigma minute, subsimple. *Capsule* not seen.—This plant has been named by Nees *Phlogacanthus asperulus*, together with many others which he did not recognize. Wight marked it "*Hemichoriste?*"; and this is probably its true affinity, though its small flowers are opposed to it. It is nearly allied to *J. flagelliformis.*

39. **J. boerhaaviæfolia,** *T. Anders. in Journ. Linn. Soc.* ix. 517; leaves petioled ovate-lanceolate uppermost sessile cordate, spikes $\frac{1}{2}$ in. secund on filiform dichtomous terminal branches, bracts subulate narrowly white-margined, corolla $\frac{1}{6}$ in. purple in the throat.

TENASSERIM; Amherst, *Falconer* (*fide* T. Anderson).

A weedy herb; stem diffuse, terete, glabrous. Cauline *leaves* long-petioled, 2–5 in. long (petiole included); upper and floral leaves $\frac{1}{2}$–$1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{2}$ in.; all glabrous above, glaucous beneath. *Corolla* 2-lipped, glabrous, with 2 lines of recurved hairs in the throat. Upper *anthers* small, sterile. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., compressed, sterile part very short (T. Anderson).—Anderson was seldom wrong in generic determinations, but his description suggests that this is a *Rungia.*

Sect. 5. **Rhaphidospora.** *Flowers* laxly panicled. *Bracts* small linear or linear-lanceolate. *Seeds* retrorsely hispid.

40. **J. glabra,** *Koen.*; *Roxb. Hort. Beng.* 4, and *Fl. Ind. ed. Carey & Wall.* i. 132; leaves petioled ovate acute puberulous on the nerves or glabrate, cymes axillary and terminal, corolla $\frac{1}{2}$ in. *Wall. Cat.* 2455; *T. Anders. in Journ. Linn. Soc.* ix. 516. J. Careyana, *Wall. Cat.* 2456. Rhaphidospora glabra, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 499; *Wight Ic.* t. 1554.

S. DECCAN PENINSULA; *Roxburgh, Wight.* CEYLON; *Walker*, &c.—DISTRIB. Java.

An erect, branched herb. *Leaves* 1½ by ¾ in. (in one example 4½ by 1 in.), base attenuate or rounded; petiole ½–1½ in. Axillary *peduncles* numerous, ½–1½ in., divaricate; pedicels 0–¼ in., puberulous or pubescent; bracts and bracteoles minute. *Calyx-segments* scarcely ⅛ in., narrow, pubescent. *Corolla* upper lip erect, emarginate, lower pendent or reflexed. Lower *anther-cell* distinctly white-tailed. *Capsule* ½ in.; seed-bearing part subquadrate ellipsoid suddenly narrowed into the linear-cylindric pedicel.

41. **J. pubigera,** *Wall. Cat.* 2490; leaves short-petioled ovate lanceolate hairy on both surfaces, cymes axillary trichotomous, corolla ⅔ in. J. Edgeworthii, *T. Anders. in Journ. Linn. Soc.* ix. 516. Peristrophe pubigera, *Nees in Wall. Pl. As. Rar.* iii. 114, and in *DC. Prodr.* xi. 498. Rhaphidospora ciliata, *Nees l. c.* 500.

TEMPERATE N.W. HIMALAYA; Bhuddimath (Kumaon), *Wallich, Royle*; Simla, *Madden*; Gangootri, alt. 4500 ft., *Strachey & Winterbottom*; Mussoorie, alt. 7000 ft., *W. S. Atkinson.*

Stems herbaceous, erect, terete, hairy. *Leaves* 2¾ by 1¼ in., cuneate or rhomboid at the base; petiole ⅛ in. *Cymes* axillary, 2–3 in., somewhat rigid, dense, ascending, hairy; bracts ⅛–⅙ in., linear; pedicels 0–⅓ in.; bracteoles 0 or minute. *Calyx* sub-5-partite; segments ⅓ in., linear, pubescent. *Corolla* pubescent, purplish-red; lower lip ⅓ in., pendent. Lower *anther-cell* distinctly white-tailed. *Capsule* ½ in., linear-clavate, pubescent. *Seeds* unripe, probably glabrous, only slightly tubercular; in which case the species will not belong to Sect. *Rhaphidospora.* The inflorescence and corolla are exceedingly like *Peristrophe*; but the small bracts and distinct anther-tails do not suit.

Sect. 6. **Rostellularia** (Gen. Nees). *Spikes* terminal and axillary, cylindric or linear. *Bracts* and *bracteoles* narrowly lanceolate, usually about as long as the calyx. *Calyx* sub-4-partite (5th segment if sometimes present small), segments linear or linear-lanceolate. *Corolla* small. *Capsule* small, 4-seeded nearly from the base. *Seeds* subconcentrically tubercular or rugose or nearly smooth.—Small closely allied weeds, abundant in the tropics, all collected under 3 or 4 ill-defined species by T. Anderson. To facilitate their description it is necessary to arrange them in more species, or reduce them to vars. of one.

42. **J. micrantha,** *Wall. Cat.* 2449, *partly*; leaves ovate or elliptic, spikes short cylindric dense, sepals oblong scarious glabrous midrib green excurrent as a very hispid arista, seeds small concentrically rugose. J. procumbens, *Linn.*; *T. Anders. in Journ. Linn. Soc.* ix. 511, *partly.* Rostellularia crinita, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 373; *Dalz. & Gibs. Bomb. Fl.* 193.

DECCAN PENINSULA; *Wight*; Vingorla (S. Concan), *Dalzell.*

Stems much branched, minutely pubescent or hirsute. *Leaves* 1½ by ¾ in., mature subglabrous or sparsely setose; raphides numerous sunk on both surfaces; petiole ⅙ in. *Spikes* ½–1½ in.; bracteoles ⅓ in., sublinear. *Sepals* much wider than the bracteoles, nearly glabrous except the awns, hispid with many patent multicellular hairs. *Corolla* ¼ in., rose-purple. *Capsule* ⅓ in., pubescent.—A strongly marked species, but it is difficult to settle the best name. Wallich's type sheet is mixed, and his name *micrantha* perhaps relates really to the small-fld. *J. procumbens* mixed thereon. As to the name *J. crinita*, that appears to relate chiefly to a mixture of *J. procumbens* var. *latispica* with *J. diffusa* var. *orbiculata.*

43. **J. quinqueangularis,** *Koen.*; *Roxb. Fl. Ind. ed. Carey & Wall.* i. 134; nearly glabrous, branches elongate, leaves linear or linear-lanceolate, spikes elongate ¼ in. broad, sepals linear-oblong tip obtuse herbaceous glabrous, capsule ¼–⅓ in. stout. *Wall. Cat.* 2443, *partly.* J. peploides,

Var. β angustifolia, *T. Anders. in Journ. Linn. Soc.* ix. 511 (*excl. syn.* J. Vahlii). Rostellularia quinquangularis, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 375.

CENTRAL INDIA, common; from W. Bengal and Agra to Belgaum.

Branches often 20 in., rigid, 4–5-angular, geniculate; internodes long. *Leaves* 3 by $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous, raphides obscure; petiole 0–$\frac{1}{8}$ in., puberulous. *Spikes* 1–6 in.; lower flowers usually opposite solitary, calyx just reaching to the next pair; bracts $\frac{1}{4}$ in., linear-oblong, glabrous, scarious-margined; bracteoles similar, smaller. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., hardly broader than the bracteoles. *Seeds* much larger than in the neighbouring species, slightly concentrically tubercular-rugose.—*J. Vahlii*, Roth, resembles this in the narrow leaves.

VAR. *peploides*; leaves oblong or ovate petiole often $\frac{1}{4}$ in., spikes shorter often subovate when young. *T. Anders. in Journ. Linn. Soc.* ix. 511 (sp.); *Boiss. Fl. Orient.* iv. 525. J. procumbens, *Wall. Cat.* 2441, *partly*. Rostellularia peploides, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 375; *Dalz. & Gibs. Bomb. Fl.* 193.—Throughout the Gangetic Plain, from the Punjab to Bengal, and through Central India to the Concan. Distrib. Affghanistan.—Usually much more branched than the type, sometimes small 3–6 in. diam. This var. is very unlike the type in general aspect, and does not graduate into it; but the obtuse glabrous sepal-tips and large capsule and seeds agree closely.

44. **J. notha,** *Clarke*; stems simple glabrous, leaves sessile oblong white-setulose on the nerves beneath, bracts elliptic, sepals linear-oblong white-setulose upwards. Rostellularia simplex, *Wight Ic.* t. 1542 (not Justicia simplex, D. Don).

INDIA?; *Herb. Wight.*

Stems 1 foot, slender, 4–5-angular. *Leaves* 1½ by $\frac{1}{3}$ in., subobtuse at both ends, transversely lineolate glabrate above. *Spikes* 2 by $\frac{1}{3}$ in., terminal, solitary, dense; bracts $\frac{1}{4}$ by $\frac{1}{8}$ in., setulose-ciliate on margins and midrib, otherwise glabrous. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{5}$ in., ellipsoid.—Wight gives no locality for this; it is a well-characterized plant, and probably Malayan.

45. **J. khasiana,** *Clarke*; stems elongate hispid, leaves sessile oblong hispid on both surfaces, bracts linear-oblong hispid, sepals sublinear hispid.

KHASIA MTS., alt. 5000 ft., common; *Griffith, H. f. & T.*, &c.

Stems 1½–3 ft., branched. *Leaves* 1½ by $\frac{1}{2}$ in. *Spikes* 2–4 by $\frac{1}{2}$ in., hardly interrupted at the base, very hispid; bracts $\frac{1}{3}$ by $\frac{1}{16}$–$\frac{1}{12}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. *Capsule* $\frac{1}{5}$ in., ellipsoid. *Seeds* undulate obscurely rugose; testa minutely reticulated.—Nearly allied to *J. notha*, but differing in the indumentum and narrower bracts.

46. **J. assamica,** *Clarke*; leaves sessile narrowly obovate obtuse glabrous, bracts narrowly oblong minutely hispid, sepals narrowly lanceolate hispidulous.

ASSAM; *Griffith* (Kew Distrib. n. 6159).

Stems prostrate, copiously rooting; flowering oranches 3–4 in., numerous, erect, 1-spicate. *Leaves* 1 by $\frac{1}{3}$ in., base long-cuneate; raphides sunk. *Spikes* 2 by $\frac{1}{5}$ in., continuous, somewhat dense; bracts $\frac{1}{6}$ by $\frac{1}{16}$ in., scarious-margined. *Corolla* nearly $\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., ellipsoid.—In the sessile leaves, large corolla, and small capsule, this is allied to *J. notha* and *J. khasiana*.

47. **J. Royeniana,** *Clarke*; leaves subsessile linear-oblong obtuse glabrous, bracts and sepals linear-lanceolate acute glistening bristle-ciliate. Rostellularia Royeniana, *Nees in DC. Prodr.* xi. 373; *T. Anders. in Thwaites Enum.* 234, *partly*.

CEYLON; *Walker, Thwaites.*

Stems 10–15 in., procumbent, branched, glabrous. *Leaves* 2 by $\frac{1}{4}$ in., obtuse, transversely lineolate above; base long attenuate, petiole 0, or in some lower leaves short. *Spikes* $2\frac{1}{2}$ by $\frac{1}{2}$ in., subinterrupted at base, longer or shorter than the peduncle; bracts $\frac{1}{3}$ by $\frac{1}{20}$–$\frac{1}{16}$ in., bracteoles $\frac{1}{4}$ in. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., glistening ciliate on the margins and keel, otherwise glabrate. *Corolla* $\frac{1}{3}$ in. *Capsule* $\frac{1}{3}$ in.—Nearly allied to *J. notha*, differing principally in the glabrate leaves and very narrow bracts.

48. **J. diffusa,** *Willd. Sp. Pl.* i. 87; leaves petioled elliptic acuminate at both ends sparsely hairy, spikes slender sparsely hairy, bracts linear-lanceolate or linear mostly shorter than the calyx, sepals lanceolate acute minutely scabrous upwards. *Roth Nov. Sp.* 14; *Wall. Cat.* 2444; *T. Anders in Journ. Linn. Soc.* ix. 512. J. procumbens, *Linn. partly*; *Vahl Symb.* ii. 14; *Roxb. Fl. Ind.* i. 132. Rostellularia diffusa, *Nees in Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 371; *Dalz. & Gibs. Bomb. Fl.* 193 (*several of these citations referring partly or mainly to plants here separately described as vars.*).

KUMAON and PUNJAB TERAI; *Strachey & Winterbottom*, &c. DECCAN PENINSULA and CEYLON, plentiful; extending north to Chota Nagpore. RANGOON; *M'Lelland.*—DISTRIB. Siam.

Stems 1–2 ft., herbaceous, quadrangular, glabrous or minutely pubescent. *Leaves* (well developed) $3\frac{1}{2}$ by $1\frac{1}{4}$ in.; raphides large, sunk, on both surfaces; petiole $\frac{1}{4}$ in., pubescent. *Spikes* 1–7 by $\frac{1}{3}$ in.; lower flowers opposite, distant the length of the calyx; bracts $\frac{1}{6}$ in., narrowly or not scarious-margined, tip minutely scabrous; bracteoles $\frac{1}{10}$–$\frac{1}{8}$ in., lanceolate. *Sepals* $\frac{1}{6}$ in., resembling the bracts. *Corolla* $\frac{1}{4}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., glabrous. *Seeds* very nearly smooth, concentric rugosities remaining as obscure tubercles.

VAR. *prostrata*, Roxb. ms.; leaves smaller often obtuse or orbicular, bracts and sepals shorter broader rather more scabrous, capsule hairy.—Deccan Peninsula and Ceylon, common.—*Stems* prostrate, intricately branched, patently hairy. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *Spikes* 1–2 by $\frac{1}{3}$ in.

VAR. *Vahlii*; leaves narrowly lanceolate or linear, bracts lanceolate white-margined, sepals lanceolate subacute tips minutely scabrous. J. Vahlii, *Roth Nov. Sp.* 14. J. quinqueangularis, *Wall. Cat.* 2443, *type sheet and mainly.* J. Vahliana, *Roem. & Sch. Syst. Mant.* i. 138. Rostellularia Vahlii, *Nees in Wall. Pl. As. Rar.* iii. 102, and in DC. Prodr. xi. 376, *partly.*—Deccan Peninsula and Ceylon, extending to Chota Nagpore, common.—It is vain to quote extensively synonymy for this plant, as the same specimen has been named differently by the highest authorities. The narrow-leaved forms have been, both by Nees and T. Anderson, mixed with *J. quinqueangularis*, which differs in the large capsule and seeds, and in the glabrous obtuse sepal-tips. In the linear-leaved forms the spikes, bracts and sepals are often as in *J. diffusa* var. *prostrata.* Connected by imperceptible gradations with *J. diffusa*, type.

VAR. *hedyotidifolia*; woody, leaves petioled ovate, spikes shortened dense, sepal-tips lengthened sometimes very ciliate. J. hedyotidifolia, *Wall. Cat.* 2450. Rostellularia hedyotidifolia, *Nees in Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 370; *Wight Ic.* t. 1540.—Mts. of S. India.—The extreme forms in Wight's herbarium are very woody and glabrous, with small black leaves; but there are herbaceous examples with larger more hairy leaves, even from the Nilgherries at 8000 ft. alt., which have been marked *J. hedyotidifolia* by Mr. Bentham, and which cannot be distinguished from *J. diffusa*, type.

VAR. *orbiculata*; leaves petioled ovate hairy specially beneath. J. orbiculata, *Wall. Cat.* 2489; *T. Anders. in Journ. Linn. Soc.* ix. 512, *partly.* Rostellularia rotundifolia, *Nees in Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 370.—Deccan Peninsula, northwards to Parasnath, *T. Anderson.* Distrib. Siam.—The examples are marked by Nees (doubtless on account of the pubescent or patently hairy stem) "Rostellularia procumbens, Var. β and γ," but the same thing is marked by T. Anderson "*hedyotidifolia,*" which is the true affinity. Most of the examples marked *orbiculata* by Nees and T. Anderson are *J. simplex*, D. Don.

49. **J. simplex,** *Don Prodr.* 118 (not Rostellularia simplex, Wight); leaves petioled ovate hairy or oblong, spikes cylindric dense hairy, bracts elliptic shortly acute scarious-marginate, sepals lanceolate acute hairy nearly to their base. J. orbiculata, *T. Anders. in Journ. Linn. Soc.* ix. 512, *partly.* J. mollissima, *Wall. Cat.* 2445. J. procumbens, *Wall. Cat.* 2441, *partly*; *T. Anders. in Journ. Linn. Soc.* vii. 40, *not of Linn.* Rostellularia rotundifolia & mollissima, *Nees in Wall. Pl. As. Rar.* iii. 100, 101, and in *DC. Prodr.* xi. 370, 373, *partly.* R. abyssinica, *Brongn.*, and glandulosa, *Nees in DC. Prodr.* xi. 372, 373.

WESTERN INDIA, alt. 2–5000 ft., in the hills, common; from Kashmir, Scinde Hills (*Stocks*), Nepal (*Wallich*), to the Nilgherries. Abundant in CENTRAL INDIA and CHOTA NAGPORE.—DISTRIB. Abyssinia, Maylaya to the Loochoo Isles.

Herbaceous, hairy, branched; branches sometimes long as in Wallich's Nepal examples, whence D. Don took his unfortunate name. *Spikes* much broader and more hairy than in any var. of *J. diffusa. Bracts* usually as long as the calyx, green-keeled, very hairy with glistening many-jointed tawny or whiteish hairs.—Near *J. procumbens,* differing in its bracts; it is very uniform to its character, but the synonymy is uncertain, as the abundant examples are marked "*crinita, peploides,*" &c., and the Abyssinian examples have several names.

VAR. *serpyllifolia,* Benth. ms. in Hohenack. n. 571; very small, leaves spikes bracts and flowers smaller.—Throughout the Deccan from Chota Nagpore to S. Madras, frequent.—*Leaves* $\frac{1}{3}$ in. diam., elliptic or round, obtuse or subacute. *Spikes* 1 by $\frac{1}{6}$ in.; bracts $\frac{1}{18}$–$\frac{1}{12}$ in., elliptic or broadly lanceolate, fulvous-hirsute.—Regarded by Bentham as a var. of *J. procumbens,* Linn.

50. **J. procumbens,** *Linn. Fl. Zeyl.* 19; leaves petioled elliptic or lanceolate hairy or glabrate, spikes cylindric dense hirsute, bracts linear-lanceolate acute, sepals sublinear acute hirsute nearly their whole length. *Roxb. Fl. Ind.* i. 132, *partly*; *Wall. Cat.* 2441, *partly*; *T. Anders. in Journ. Linn. Soc.* ix. 511, *partly*; *Benth. Fl. Austral.* iv. 549, *with Australian syn.* J. micrantha, *Wall. Cat.* 2449, *chiefly.* J. hirtella, *Wall. Cat.* 2448. Rostellularia procumbens, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 371, *partly* (excl. all Himalayan examples); *Dalz. & Gibs. Bomb. Fl.* 193. R. adenostachya, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 373.

S. DECCAN PENINSULA with CEYLON, frequent; extending north to the S. Concan. —DISTRIB. Malaya, Australia.—Separated from *J. simplex* by the narrower bracts; a character which at all events suits the geography better than the distinctions put forward by Nees, and accepted by T. Anderson.

VAR. *latispica,* Clarke; stouter, spikes larger, bracts and corolla longer. Rostellularia procumbens, *Wight Ic.* t. 1539. R. mollissima, *Nees in DC. Prodr.* xi. 373, *partly.*—Mts. of S. India and Ceylon, common. Khasia Mts. and adjacent parts of Assam, frequent. Pegu and Tenasserim.—*Bracts* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{20}$ in., hispid-ciliate. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in.—The type of this var. is Wight Ic. t. 1539 (excellent), which shows the narrow bracts very correctly, and represents the common Nilgherry form: from this the Khasian and Malayan forms cannot be distinguished. In Ceylon a larger, more woody form is frequent; this is marked by Nees *R. procumbens & grandiflora.* The objection to calling this plant *mollissima* is that the type of *J. mollissima* (and *J. orbiculata*) was the round-leaved hairy Var. *vestita* of *J. diffusa.*

SPECIES NOT SEEN.

J. BIFLORA, *Vahl Symb.* ii. 9; leaves ovate, peduncles axillary 2-fld. as long as the leaves, bracts subulate. *Nees in DC. Prodr.* xi. 428.

INDIA; *Schumacher.*

A branched undershrub. *Leaves* 1 in., but little attenuate, base acute, very glabrous; petiole lax, lower as long as the leaves. *Peduncles* filiform; 2 petioled

bracts at the base of the unequal pedicels, oblong, acute; floral bracts 3 under each calyx, unequal; 2 subulate, the third ovate. *Calyx* 5-partite (Vahl).

J. Moretiana, *Vahl Enum.* i. 162; leaves lanceolate, flowers solitary axillary and in a short bracteated terminal spike, calyx 5-toothed half the way down, corolla ¼ in. 2-lipped, capsule ½ in. 4-seeded. *Nees in DC. Prodr.* xi. 428.—*Burm. Thes. Zeyl.* t. 3, fig. 1.

Ceylon; *Burmann.*

Leaves 2½ by ⅝ in., acute at both ends; petiole ⅛ in. Axillary *flowers* on peduncles ¼ in., ebracteate; spicate flowers subsessile, bracts ⅓ in., oblong, acute. *Calyx* ⅛ in., toothed hardly half-way down, lobes subtriangular lanceolate. *Corolla* upper lip erect, ovate, subentire, lower pendent deeply 3-lobed. *Capsule* solid below.—The good picture of the capsule and seeds renders it nearly certain that this was some *Justicia*: the inflorescence is very nearly that of *J. glauca,* but the bracts are much too narrow and acute for that species.

XXXIX. ADHATODA, *Nees.*

As *Justicia* Sect. *Betonica,* except that the anther-cells are acute, sometimes minutely apiculate, but scarcely spurred.—Species 6, Tropical; 1 Indian, 1 Cosmopolitan, 5 African or American.

Bentham (in Gen. Plant.) says of the anther-cells, "minime calcaratæ," but this is an error, and the genus should be merged in *Justicia* Sect. *Betonica,* following Nees and Anderson.

1. **A. vasica,** *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 387; leaves elliptic acute at both ends entire minutely pubescent, spikes dense short, bracts ovate or obovate subacute puberulous or glabrate, corolla 1¼ in. white tube short. *Dalz. & Gibs. Bomb. Fl.* 194. Justicia Adhatoda, *Linn.*; *Lamk. Ill.* t. 12, fig. 1; *Roxb. Fl. Ind.* i. 126; *Blume Bijd.* 785; *Wall. Cat.* 2434; *Bot. Mag.* t. 861; *Griff. Notul.* iv. 140; *T. Anders. in Journ. Linn. Soc.* ix. 509.—Adhatoda sp. *Griff. Notul.* iv. 141, and *Ic. Pl. As.* t. 424. *Rheede Hort. Mal.* ix. t. 43.

India; from the Punjab and Assam to Ceylon and Singapore, common, frequently cultivated.—Distrib. Malaya, S.E. Asia.

A dense shrub, 4–8 ft.; sometimes arborescent, 20 ft. *Leaves* 8 by 3 in.; petiole 1 in. *Spikes* 1–3 in., terminal, often several together; bracts ¾ by ½ in., elliptic; bracteoles ½ by ⅛ in., falcate-oblong. *Calyx* ⅓–½ in., deeply 5 lobed; lobes equal, lanceolate. *Corolla-tube* ⅓–½ in. broad; lips white, palate transversely rose-barred. *Stamens* glabrous; anther-cells acuminate at base, sometimes minutely white-tailed. *Ovary* and style-base minutely hairy. *Capsule* ¾ in., clavate, pubescent, 4-seeded. *Seeds* ⅓ in. diam., glabrous, tubercular-verrucose.

2. **A. Beddomei,** *Clarke*; leaves oblong attenuate at both ends entire minutely pubescent, spikes peduncled capitate, bracts ovate subacute puberulous or glabrate, corolla ⅝ in. creamy white tube short.

S. Travancore, alt. 3000 ft.; *Beddome.*

A very large shrub (*Beddome*). *Leaves* 6 by 1½ in.; petiole ½ in. *Peduncles* ½–⅝ in., axillary, opposite, stout; heads 1 in. diam.; bracts ½ by ¼–⅓ in., narrowed at base; bracteoles ¼–⅓ in., narrowly oblong. *Calyx* ¼ in., sub-5-partite; segments narrowly oblong, acute, minutely pubescent especially within. *Corolla* hairy; tube ¼ in., broadly cylindric; lips oblong, upper emarginate, lower 3-lobed nearly to the base. *Filaments* stout, glabrous except at base; anther-cells superposed, lower obscurely tailed. *Ovary* glabrous, 4-ovulate; style hairy; stigma minutely bifid. *Capsule* not known.

XL. **RHINACANTHUS,** *Nees.*

Shrubs, sometimes subscandent. *Leaves* entire. *Panicle* divaricate or dense; flowers solitary (or in minute cymes), sessile; bracts and bracteoles small, linear-lanceolate. *Calyx* small, sub-5-partite, segments linear-lanceolate. *Corolla* white, tube very long narrowly cylindric, scarcely widened at the top; limb 2-lipped, upper lip lanceolate acuminate entire or shortly 2-lobed, recurved or twisted, lower broad 3-lobed. *Stamens* 2, inserted near the top of the corolla-tube; anthers 2-celled; cells superposed, muticous. *Ovary* 4-ovulate; style filiform, minutely bifid at the tip. *Capsule* clavate, 4-seeded, stalk long solid cylindric. *Seeds* ovoid, moderately compressed, glabrous, obscurely rugose or tuberculate.—Species 4, tropical Asiatic and African.

1. **R. communis,** *Nees in Wall. Pl. As. Rar.* iii. 109, and in *DC. Prodr.* xi. 442; leaves oblong or ovate-oblong pubescent or glabrate, panicle large spreading, calyx densely pubescent. *Wight Ill.* 164 bis, fig. 9, and *Ic.* t. 464; *Dalz. & Gibs. Bomb. Fl.* 194; *T. Anders. in Journ. Linn. Soc.* ix. 522. Rh. Rottlerianus, *Nees in Wall. Pl. As. Rar.* iii. 109, and in *DC. Prodr.* xi. 443. Justicia nasuta, *Linn.*; *Roxb. Fl. Ind.* i. 120; *Blume Bijd.* 785; *Wall. Cat.* 2440; *Blanco Fl. Filip.* 14; *Bot. Mag.* t. 325; *Griff. Notul.* iv. 143. J. Rottleriana, *Wall. Cat.* 2477.—*Rheede Hort. Mal.* ix. t. 69.

Throughout INDIA, cultivated; perhaps wild in the Deccan Peninsula and CEYLON. —DISTRIB. Java, Madagascar, &c., cultivated.

Leaves 3–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., usually narrowed at both ends, margin undulate; petiole $\frac{1}{3}$ in. *Cymes* terminal and on short lateral branches, dusky-pubescent; flowers often clustered; bracts and bracteoles 0–$\frac{1}{12}$ in., linear. *Calyx* $\frac{1}{10}$ in. *Corolla-tube* 1 by $\frac{1}{16}$ in.; lobes $\frac{1}{3}$ in., 3 lower each twice as broad as the shortly bifid upper.

VAR. *montana*; leaves ovate softly hairy often furred beneath base frequently obtuse. J. scandens, *Vahl Symb.* ii. 7. J. dichotoma, *Rottl. & Willd. in Nov. Act. Nat. Cur.* iv. 221 (fide Nees). Dianthera paniculata, *Lour. Fl. Cochinch.* i. 26. —Mts. of S. Deccan, alt. 3–6000 ft., frequent.—Perhaps the wild state, of which the narrow-leaved glabrate *R. communis* is the domesticated form.

2. **R. calcaratus,** *Nees in Wall. Pl. As. Rar.* iii. 109, and in *DC. Prodr.* xi. 444; leaves large elliptic or narrow-obovate acuminate at both ends glabrous, panicle terminal somewhat dense flowers very many. *T. Anders. in Journ. Linn. Soc.* ix. 522. Justicia calcarata, *Wall. Pl. As. Rar.* ii. 9, t. 113, and *Cat.* 2426.

KHASIA MTS.; *Wallich*, &c. CACHAR; *Keenan.*

Branches stout. *Leaves* 10 by 4 in.; petiole $1\frac{1}{2}$ in. *Panicle* 6 by 4 in., nearly glabrous; peduncle 1–2 in.; bracts $\frac{1}{10}$ in. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in., nearly glabrous; lobes linear-lanceolate. *Corolla* as of *R. communis*, but larger; tube $1\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in.; upper lip subentire, or lobes minute setaceous, twisted. *Capsule* not seen.

XLI. **DIANTHERA,** *Linn.*

Diffuse herbs or undershrubs. *Leaves* petioled, ovate or oblong, puberulous or glabrate. *Spikes* or *panicles* terminal, axillary sometimes added; flowers, or many of the lower, distant; bracts and bracteoles small. *Calyx* sub-5-partite; segments narrow. *Corolla* small or middle-sized, white yellowish or rose-purple, 2-lipped; upper lip suberect emarginate, lower pendent, 3-lobed. *Stamens* 2, glabrous or nearly so; anther-cells 2, ellips-

oid, muticous, subopposite or superposed. *Ovary* glabrous or nearly so, 4-ovuled; style minutely hairy below, tip sub-bifid. *Capsule* clavate, 4-seeded, base subcylindric solid. *Seeds* compressed, scabrous verrucose or subhispid.—Species 80, chiefly American; about 10 in the tropics of the Old World.

The character of the genus is here narrowed to the Indian species, which differ from the small-flowered Justicias (*J. vasculosa,* &c.) only by having the lower anther-cell absolutely muticous.

Flowers ¼–⅓ *in., sessile or nearly so.*

1. **D. leptostachya,** *Benth. in Gen. Pl.* ii. 1114; leaves elliptic or oblong narrowed at both ends puberulous on the nerves beneath or glabrate, bracts hardly $\frac{1}{10}$ in. linear. Ruellia leptostachya, *Wall. Cat.* 2411. Leptostachya Wallichii, *Nees in Wall. Pl. As. Rar.* iii. 105, and in *DC. Prodr.* xi. 379, *the Indian plant only*; *Wight Ic.* t. 1543. Justicia Wallichii, *T. Anders. in Journ. Linn. Soc.* ix. 516.—Adhatoda sp. n. 17, *Herb. Ind. Or. H.f. & T.*

MTS. of S. DECCAN PENINSULA; Courtallum, &c., *Wight,* &c.

A herb; stem terete, puberulous. *Leaves* 4½ by 1¾ in., puncticulate on both surfaces; petiole ½–2 in. *Spikes* linear, slender, interrupted, mostly collected in a terminal panicle 8–10 in. diam., puberulous; flowers opposite; pedicels 0–$\frac{1}{10}$ in., or the lower developed into very small cymes. *Calyx-segments* $\frac{1}{10}$–⅛ in., linear-lanceolate, puberulous. *Corolla* scarcely ¼ in., nearly glabrous. *Capsule* ½ in., clavate, puberulous. *Seeds* glabrous, tubercular-verrucose.—The Philippine plant (Cuming, n. 548), combined with this species by Nees, is different, and probably not of this genus (fide Bentham).

2. **D. virgata,** *Benth. in Gen. Pl.* ii. 1114; leaves elliptic narrowed at both ends pubescent on the nerves beneath, bracts ovate or elliptic acute as long as the calyx. Justicia virgata, *T. Anders. in Journ. Linn. Soc.* ix. 516, *chiefly.*—Adhatoda sp. n. 18, *Herb. Ind. Or. H.f. & T.*

SIKKIM and KHASIA MTS., alt. 1–3000 ft., frequent; *Griffith, H.f. & T.,* &c.

A somewhat slender herb, 2–3 ft. *Leaves* 4½ by 1¾ in., acuminate, punctulate on both surfaces, base attenuate or rhomboid; petiole 1 in., pubescent. *Spikes* 3–6 in., linear, slender, interrupted, terminal, 1–3 together, or sometimes panicled; bracts ⅛ in.; flowers opposite, solitary, sessile. *Calyx* sub-5-partite; segments ⅛ in., linear-lanceolate, minutely pubescent. *Corolla* ¼ in., white or slightly yellow-tinged. *Anther-cells* completely superposed. *Capsule* ½ in., clavate, puberulous. *Seeds* glabrous, tubercular-verrucose.—Leptostachya virgata, *Nees in Wall. Pl. As. Rar.* iii. 105, and *Cat.* 7177, and in *DC. Prodr.* xi. 379, from Ava, united with this by T. Anderson, has a very large panicle, cymose flowers and linear bracts, and seems much nearer *D. leptostachya.*

3. **D. debilis,** *Clarke*; leaves cordate-lanceolate pubescent on the nerves beneath, bracts linear or linear-oblong shorter than the calyx.

KHASIA TERAI, alt. 500 ft.; Shaila, *Clarke.*

Resembling *D. virgata,* but very weak. *Leaves* 4½ by 1¾ in., acuminate, membranous; petiole 1½ in. *Spikes* 1–3 in., linear, often 3 on a terminal peduncle 1–2 in.; bracts $\frac{1}{12}$ in., pubescent; flowers opposite, solitary, distant. *Calyx* sub-5-partite; segments ⅛ in., linear, pubescent. *Corolla* ⅓ in., yellowish-white. *Anther-cells* parallel, one very slightly higher than the other. *Ovary* glabrous; base of style hairy. Young *capsule* as of *D. virgata.*

4. **D. Griffithii,** *Benth. in Gen. Pl.* ii. 1114; leaves petioled ovate acute glabrous, panicles terminal trichotomous, bracts and bracteoles

minute subulate glabrous. Justicia Griffithii, *T. Anders. in Journn. Linn. Soc.* ix. 516.

MISHMEE HILLS; *Griffith* (fide T. Anderson).

A glabrous herb; stem terete, base woody, upwards herbaceous tetragonous. *Leaves* 4–10 by 2–4 in.; base decurrent. *Panicles* with elongate, ascending branches; flowers remote, opposite, solitary, sessile. *Sepals* 5, linear. *Corolla* ½ in., tube ventricose; limb 5-partite, green, lower lip spotted red. *Ovary* 4-ovulate. *Capsule* a little longer than the corolla, subclavate at the tip, acute (T. Anderson).—Not seen.

** *Flowers ½ in. or more, many distinctly pedicelled.*

5. **D. collina,** *Clarke*; leaves ovate nearly glabrous, panicles terminal and axillary, anther-cells muticous distant superposed. Justicia collina, *T. Anders. in Journ. Linn. Soc.* ix. 515.

SIKKIM and BHOTAN, alt. 5–7000 ft.; *Griffith, H.f. & T.*, &c. KHASIA MTS., alt. 4000 ft.; *Griffith*.

A diffuse herb, 1–2 ft., branches puberulous. *Leaves* 3 by 1½ in., acute, base cuneate or of the upper leaves almost rounded; petiole 1 in., or of the upper leaves sometimes 0. *Cymes* few-fld., running into an elongate terminal panicle by the gradual reduction of the leaves into bracts; proper bract hardly $\frac{1}{10}$ in., linear; pedicels 0–¼ in.; bracteoles minute or 0. *Sepals* ¼ in., linear, green, glabrous. *Corolla* ¾ in., white, nearly glabrous; tube elongate cylindric. *Capsule* ½ in., clavate, glabrous, 4-seeded. *Seeds* verrucose-scaly, obscurely hispidulous.

6. **D. dichotoma,** *Clarke*; leaves ovate acute nearly glabrous, panicles terminal minutely pubescent, anther-cells muticous one superposed for half its length. Justicia dichotoma, *Blume Bijd.* 783; *T. Anders. in Journ. Linn. Soc.* ix. 516. Rhaphidospora dichotoma, *Nees in DC. Prodr.* xi. 500. Leptostachya dichotoma, *Nees l. c.* 379. Peristrophe dichotoma, *Hassk. Cat. Hort. Bogor.* 152.

CEYLON (fide T. Anderson).—DISTRIB. Java, Philippines.

Much resembling *D. collina*, the corolla rather more ventricose and rose-purple.—There is no Ceylon example of this at Kew. We may suppose that T. Anderson had seen such at Calcutta; C. P. 2718, which he quotes, is certainly not this plant.

DOUBTFUL SPECIES.

D.? INDICA; leaves scarcely 1 in. rhomboid-ovate acute hairy, flowers congested into axillary and terminal decompound globose or oblong spikes, spikelets by suppression mostly 1-fld. supported by a lanceolate often empty bract. Rhytiglossa? indica, *Wawra in Oestr. Bot. Zeit.* 1881, 281, and *Bot. Reis. Pr. S. Cob.* 82, t. 9, fig. A.

GARWHAL; at Mussoorie, alt. 4000 ft., *Wawra*.

An undershrub; branches prostrate, variously twisted and incurved. Uppermost *bract* sterile, with the fertile valvately enclosing the single flower of the spikelet; bracteoles linear-setaceous, similar to the calyx-segments. *Corolla* ringent, rose, hairy; tube as long as the calyx; lips as long as the tube, upper ovate, emarginate; lower longer, cuneately 3-lobed. *Filaments* flattened; anther-cells superposed, ovate, muticous. *Style* capillary, elongate after flowering, bifid. *Ovary* 4-ovulate.—Not seen. I know of no woody prostrate Acanthaceous plant at Mussoorie, and do not understand the bracts as described.

XLII. PTYSSIGLOTTIS, *T. Anders.*

A small, procumbent herb. *Leaves* ovate, entire. *Spikes* peduncled, few-fld.; bracts and bracteoles linear. *Calyx* sub-5-partite; segments

linear. *Corolla-tube* short, limb 2-lipped; upper lip shortly 2-fid, lower 3-lobed; lobes imbricate in bud. *Stamens* 2; anthers 2-celled; cells ellipsoid, parallel, approximate, muticous or base minutely apiculate. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* clavate, 4-seeded. *Seeds* compressed, orbicular, verrucose-scaly, almost muricate, not hairy.

P. radicosa, *T. Anders. in Thwaites Enum.* 235, *excl. syn.*; *Bedd. Ic. Pl. Ind. Or.* t. 267. Rhytiglossa radicosa, *Nees in DC. Prodr.* xi. 344.

CEYLON; Champion, *Thwaites.*

Stems 3–8 in., weak, rooting, branched, puberulous. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., obtuse or subacute at either end, lineolate, nearly glabrous; petiole $\frac{1}{16}$–$\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$–1 in., terminal, slender; spikes $\frac{1}{4}$–$\frac{1}{3}$ in.; bracts $\frac{1}{8}$ in. *Sepals* $\frac{1}{6}$ in. *Corolla* $\frac{1}{8}$–$\frac{1}{4}$ in., nearly straight, pubescent. *Capsule* $\frac{1}{3}$ in., 4-seeded near the top; stalk solid, linear-cylindric.—*Rostellularia sarmentosa,* Zoll., described as having the capsule 4-seeded nearly from the base, does not belong here (cf. Benth. in Gen. Pl. ii. 1118).

XLIII. SPHINCTACANTHUS, *Benth.*

An erect, glabrous shrub. *Leaves* large, toothed or subentire. *Spikes* interrupted, forming a terminal panicle; flowers opposite; bracts and bracteoles small. *Calyx* sub-5-partite; segments linear. *Corolla-tube* ovoid, inflated, constricted at the top; limb 2-lipped, upper emarginate, lower 3-lobed pendent; lobes imbricated in the bud. *Stamens* 2; anthers 2-celled; cells oblong, approximate, muticous. *Ovary* 4-ovulate; style linear, minutely bifid. *Capsule* unknown.

S. Griffithii, *Benth. in Gen. Pl.* ii. 1118; *Hook. Ic. Pl.* t. 1205. Justicia orchioides, *Griffith ms.*

MISHMEE MTS., or PATKOYE HILLS in S.E. Assam; *Griffith* (Kew Distrib. n. 6161).

Leaves 7½ by 3¼ in., acute at both ends; petiole 1 in. *Panicle* 5 by 4 in.; branches opposite; bracts $\frac{1}{10}$ in. *Calyx* $\frac{1}{10}$ in. *Corolla-tube* $\frac{1}{8}$ by $\frac{1}{12}$ in; lobes $\frac{1}{8}$–$\frac{1}{6}$ in., those of the lower lip subacute. *Filaments* glabrous, except near the base.

XLIV. ECBOLIUM, *Kurz.*

A small, nearly glabrous, shrub. *Leaves* entire. *Spikes* terminal, dense; bracts large, imbricate, somewhat 4-ranked; bracteoles small, narrow. *Calyx* sub-5-partite; segments equal, narrow. *Corolla-tube* long, subfiliform; limb 2-lipped; upper lip narrow shortly bifid, lower 3-lobed pendent; lobes imbricate in bud. *Stamens* 2, attached near the top of the corolla-tube; anthers 2-celled; cells oblong, parallel, approximate, muticous. *Ovary* 4-ovulate; style filiform, very shortly bifid. *Capsule* long-stalked, ovoid, compressed, 4-seeded. *Seeds* 4 or more often 2, large, compressed, orbicular, tubercular-scabrous.

E. Linneanum, *Kurz in Journ. As. Soc.* 1871, pt. ii. 75; leaves petioled ovate or lanceolate, bracts ovate obtuse entire puberulous or pubescent, corolla greenish-blue or purplish. *Boiss. Fl. Orient.* iv. 526. Justicia Ecbolium, *Linn.*; *Roxb. Fl. Ind.* i. 114; *Wall. Cat.* 2432; *Bot. Mag.* t. 1847; *Wight Ic.* t. 463; *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 427; *Dalz. & Gibs. Bomb. Fl.* 194. J. ligustrina, *Vahl Enum.* i. 118. J. emarginata, *Nees in DC. Prodr.* xi. 427. Eranthemum Ecbolium, *T. Anders. in Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 523.—*Burm. Thes. Zeyl.* 7, t. 4, fig. 1. *Rheede Hort. Mal.* ii. t. 20.

S. DECCAN PENINSULA and CEYLON. MALACCA; *Maingay.*—DISTRIB. Arabia, Abyssinia, Madagascar.

Branches pubescent upwards. *Leaves* 4 by 1¾ in., cuneate or rhomboid at both ends, puberulous or pubescent on the nerves; petiole ¼ in. *Spikes* 2½ by ¾ in., dense; bracts ¾ by ⅓–½ in., sometimes softly hairy; bracteoles scarcely ¼ in., sublinear. *Calyx* ¼ in., pubescent. *Corolla* pubescent; tube 1–1¼ by $\frac{1}{16}$ in.; lobes ½ in. *Stamens* glabrous, except the base of the filaments; anther-cells submucronate at the base. *Ovary* hairy at the tip. *Capsule-stalk* ⅓ in., linear-cylindric, seed-bearing part ⅓ in. diam. *Seeds* ¼ in. diam., pale-coloured.—This, the typical form, is stated by Wight to be frequent in S. Madras, but there is very little of it in the Herbarium.

VAR. *rotundifolia*; leaves sessile ovate or roundish, bracts subdentate often with a very short acumination. Justicia rotundifolia, *Nees ll. c.*—Coimbatore; *Wight*, nn. 2008, 2266.—A woody undershrub, with shortened internodes and smaller leaves; Wight's are the only examples at Kew.

VAR. *lætevirens*; glabrescent, leaves larger petioled broadly lanceolate acute at both ends, spikes often 6–8 in. more lax, bracts ¾ by ½ in. broadly lanceolate entire dusky-pubescent. Justicia lætevirens, *Vahl Enum.* i. 118; *Nees in DC. Prodr.* xi. 427.—S. Deccan Peninsula and Ceylon.—This appears the common South Indian form, and when the bracts become denticulate it passes by degrees into the next.

VAR. *dentata*; glabrescent, leaves larger petioled ovate or lanceolate acute, spikes dense, bracts ¾ by ¼–½ in. ovate acuminate toothed. Justicia dentata, *Klein*; *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 427. J. livida, *Nees in DC. Prodr.* xi. 427; *Wight Ic.* t. 1546.—Bengal, Assam and Pegu, very common. W. Deccan Peninsula, *Wight, Ritchie.*—The Bengal form has glabrate thin bracts, and a lurid or steely green-blue corolla. The Malabar form should perhaps be referred to Var. *lætevirens.*

XLV. **GRAPTOPHYLLUM,** *Nees.*

Glabrous shrubs. *Leaves* often variegated. *Flowers* pedicelled, clustered; clusters forming terminal thyrses; bracts and bracteoles very small, narrow. *Calyx* small, sub-5-partite; segments equal, linear-lanceolate. *Corolla-tube* curved; limb 2-lipped, upper lip shortly 2-fid, lower 3-lobed. *Stamens* 2, 2 minute staminodes added; anthers oblong, 2-celled; cells parallel, muticous. *Ovary* 4-ovulate; style filiform, scarcely bifid. *Capsule* oblong, hard, contracted into a long stalk. *Seeds* usually 2, orbicular or subquadrate, compressed flat, lacunose-rugose.—Species 4, Australian or Pacific, one long time cultivated.

G. hortense, *Nees in Wall. Pl. As. Rar.* iii. 102, and in *DC. Prodr.* xi. 328; leaves petioled broadly elliptic narrowed at both ends entire, corolla 1–1⅓ in. crimson. *T. Anders. in Journ. Linn. Soc.* ix. 523. G. pictum, *Griff. Notul.* iv. 139. Justicia picta, *Linn.*; *Roxb. Fl. Ind.* i. 117; *Wall. Cat.* 2438; *Blume Bijd.* 784; *Blanco Fl. Filip.* 12; *Bot. Mag.* t. 1870; *Bot. Reg.* t. 1227; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71.—*Rheede Hort. Mal.* vi. t. 60. *Rumph. Herb. Amb.* iv. t. 30.

Throughout INDIA and MALAYA cultivated; where wild, uncertain.

Leaves 4½ by 1¾ in.; petiole ½ in. *Pedicels* often ¼ in. *Calyx* ⅛ in. The description of the capsule and seeds is taken from "Gen. Plant."

XLVI. **RUNGIA,** *Nees.*

Diffuse or erect herbs, or shrubs. *Leaves* entire. *Spikes* dense, terminal or axillary, 1-sided; bracts 2-ranked, or 4-ranked, with 2 of the ranks often flowerless; flowering bracts often scarious-margined; bracteoles

similar to the bracts or narrow. *Calyx* small, deeply 5-lobed; segments linear-lanceolate. *Corolla* small, blueish or white; limb 2-lipped, upper lip emarginate shorter than the lower 3-lobed lip. *Stamens* 2; anthers 2-celled, cells parallel subequal, or more often superposed, lower cell muticous or white-tailed. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* ovoid or oblong, shortly stalked; after dehiscence the placentæ with the retinacula rise elastically from the base of the capsule, scattering the seeds. *Seeds* 4, compressed, orbicular, glabrous, verrucose, sometimes minutely, sometimes very strongly, so that the seed is concentrically rugose or subcristate.—Species 20, mostly Asiatic, a few Tropical African.

I am unable to make sections of this genus; the species are described in order of their size, beginning with the largest.

1. **R. sisparensis,** *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves large elliptic acuminate at both ends glabrous, bracts dimorphic bifarious ovate subacute not acuminate glabrous, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. Adhatoda sisparensis, *Benth. in Pl. Hohenack.* n. 1436.

NILGHERRIES; Sispara, *Wight*, *Gardner*, &c.; Valla Caudoo, *Wight*; Wynaad, *Beddome.*

Shrubby, nearly glabrous. *Leaves* 6 by $1\frac{3}{4}$ in., obscurely lineolate; petiole 1 in. *Spikes* 2–3 by $\frac{3}{4}$ in., 1-sided, 2 series of large empty bracts on one side, 2 series of smaller flowering ones on the other; empty bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at both ends, shining green, not or very narrowly marginate, striate; flowering bracts similar but hardly half so large, subscariose, more acute; bracteoles $\frac{1}{8}$ in., lanceolate. *Calyx* $\frac{1}{6}$ in.; segments linear-lanceolate, minutely pubescent. *Anther-cells* separated, lower white-tailed. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., minutely pubescent. *Seeds* verrucose, almost tubercled.

2. **R. Wightiana,** *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 472; leaves large lanceolate or ovate-lanceolate glabrous, bracts dimorphic obscurely 2-ranked round-ovate prominently margined nearly glabrous, corolla $\frac{1}{3}$ in. *Wight Ic.* t. 1549; *T. Anders. in Journ. Linn. Soc.* ix. 518. R. Arnottiana, *Wight Ic.* t. 1550. Justicia Wightiana, *Wall. Cat.* 2472.

S. DECCAN PENINSULA; Courtallum, *Wight*, *G. Thomson*; Attramallay, *Beddome.*

Leaves $6\frac{1}{2}$ by 2 in., base attenuate, lineolate; petiole $1\frac{1}{2}$ in. *Spikes* 2 by $\frac{1}{3}$ in., somewhat laxly imbricate, often panicled; empty bracts $\frac{1}{4}$ in. diam., obtuse rarely minutely apiculate; flowering bracts rather narrower, somewhat obovate; bracteoles $\frac{1}{8}$ in., subovate, pubescent. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in.; segments linear-lanceolate, minutely pubescent. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{3}$ in., minutely pubescent. *Seeds* subtubercular verrucose.—*R. Arnottiana*, Wight, differs only in the uppermost leaves being as broad as the middle cauline.

3. **R. læta,** *Clarke*; leaves ovate acute at both ends subglabrous, bracts large broadly elliptic acute marginate ciliate, corolla $\frac{2}{3}$ in.

S. DECCAN PENINSULA (?); *Herb. Wight.*

Leaves $2\frac{1}{4}$ by $1\frac{1}{4}$ in.; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{1}{4}$ in., axillary; spikes $1\frac{1}{2}$ by $\frac{2}{3}$ in.; bracts sub-4-seriate, all fertile, $\frac{2}{3}$ by $\frac{1}{3}$ in., narrowed at base; margin prominent, scarious, purplish; bracteoles $\frac{1}{3}$ in., linear, glabrous. *Calyx* $\frac{1}{4}$ in.; segments linear-lanceolate, puberulous. *Anther-cells* oblong, contiguous, parallel, one scarcely lower than the other, slightly whitened, not tailed at the base. *Ovary* glabrous, subglandular, style hairy near the base. *Capsule* not seen.—This appears much the finest species in the genus, but there is only a branchlet in Herb. Wight.

4. **R. latior,** *Nees in DC. Prodr.* xi. 472; scabrous-pubescent, leaves

petioled ovate or broad-lanceolate, spikes ovoid or oblong dense often clustered, bracts roundly obovate margined hairy, bracteoles obovate margined, corolla $\frac{1}{3}$ in. *Wight Ic.* t. 1548; *T. Anders. in Journ. Linn. Soc.* ix. 518 (*except the Ceylon plant*). R. longifolia, *T. Anders. in Thwaites Enum.* 235, *partim.*

MTS. of S. DECCAN PENINSULA; *Wight, Gardner,* &c.

Stems herbaceous, hairy. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., cuneate at both ends; petiole $\frac{1}{3}$ in. *Spikes* 1 by $\frac{1}{2}$ in.; bracts obscurely 4-seriate (many barren more or less unlike the fertile), $\frac{1}{4}$ by $\frac{1}{3}$ in., obtuse rarely apiculate; bracteoles similar to the bracts, but smaller. *Calyx* $\frac{1}{8}$ in.; segments linear-lanceolate, softly hairy. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{6}$ in., nearly glabrous. *Seeds* small, minutely glandular-verrucose, ultimately glabrous.—This is not allied to *R. repens* as Nees supposed, but may be a var. of *R. longifolia,* as T. Anderson first supposed.

5. **R. longifolia,** *Nees & Arn. in DC. Prodr.* xi. 471, *excl. Philippine example, not of Beddome*; nearly glabrous, leaves linear-lanceolate, spikes shortly oblong often clustered, bracts biform fertile roundly obovate marginate minutely pubescent, corolla $\frac{1}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 517, *chiefly.*

CEYLON; *Walker,* &c.

Leaves 4 by $\frac{1}{2}$ in. Flowerless *bracts* in 2 ranks on one side of the spike, ovate-lanceolate, obscurely margined. Otherwise as *R. latior,* from which this typical form of *R. longifolia* is easily separable: not so the

VAR. *latifolia,* Wight ms.; leaves lanceolate or ovate-lanceolate, barren bracts few less distinctly 2-ranked less unlike the fertile. R. latior, *Nees & T. Anders. in herb. partim.*—Ceylon, numerous examples. S. Travancore; *Beddome.*—I follow Wight (in preference to Nees and T. Anderson) in regarding all the Ceylon forms as one species, of which the S. Indian is an allied species, or a variety. T. Anderson divided Thwaites n. 89 between *R. latior* and *R. longifolia,* depending upon the breadth of the leaves alone.

6. **R. crenata,** *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves petioled ovate-lanceolate sparsely hairy, spikes short dense 1-sided, bracts markedly biform barren oblong acute mucronate fertile orbicular marginate, corolla $\frac{1}{3}$ in. Rungia sp. n. 9, *Herb. Ind. Or. H.f. & T.*

W. DECCAN PENINSULA; Canara, *Law*; Concan, *Stocks*; Belgaum, *Ritchie.*

Stem herbaceous, ramous, nearly glabrous. *Leaves* $2\frac{1}{2}$ by 1 in., base shortly acuminate, sparsely laxly hairy on both surfaces, finally scabrid lineolate glabrate; petiole $\frac{1}{4}$ in. *Spikes* 1 by $\frac{2}{3}$ in., terminal, or sessile quasi-axillary clustered; flowerless bracts in 2 regular series on one side the spike, $\frac{1}{3}$ by $\frac{1}{10}$ in., green, striate, not or very narrowly margined; flowering bracts $\frac{1}{6}$ in. diam., somewhat hairy; bracteoles $\frac{1}{8}$ in., obovate, scarious-margined. *Calyx* $\frac{1}{8}$ in.; segments linear-lanceolate, pubescent. *Capsule* scarcely $\frac{1}{6}$ in., pubescent.—Allied to *R. parviflora,* Nees, but with much longer flowerless bracts.

7. **R. stolonifera,** *Clarke*; leaves petioled ovate minutely scabrid-pubescent, bracts ovate minutely hairy, calyx glabrous, corolla tubular $\frac{1}{2}$-$\frac{2}{3}$ in., anther-cells white-tailed. Dicliptera sp. n. 14, *Herb. Ind. Or. H.f. & T.* Justicia sp. (Sect. Rostellularia), *Benth. ms. in Herb. Kew.*

KHASIA MTS., alt. 2–5000 ft.; *H.f. & T.,* &c.

Stems 18 in., procumbent, rooting, branched; many small-leaved barren branches from the lower nodes. *Leaves* 1–3 by $\frac{3}{4}$–$1\frac{1}{2}$ in., cuneate at both ends, undulate sometimes sinuate, with few minute scattered hairs on both surfaces; petiole $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$–$1\frac{1}{2}$ in., terminal and quasi-axillary, imperfectly 2–4-farious; bracts $\frac{1}{4}$ by $\frac{1}{8}$ in., subobtuse, scarious-margined; bracteoles oblong, nearly as long as the bracts. *Calyx* $\frac{1}{8}$ in., deeply 5-partite; segments narrowly lanceolate, scarious. *Corolla-tube* $\frac{1}{2}$ by

$\frac{1}{12}$ in., narrowly cylindric, straight; limb $\frac{1}{8}$ in., 2-lipped; upper lip erect, subentire, lower pendent. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., nearly glabrous; placentæ rising elastically from the base. *Seeds* minutely glandular-papillose, glabrate when fully ripe.

8. **R. khasiana,** *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves petioled ovate or elliptic minutely scabrid-pubescent, bracts ovate acuminate somewhat pubescent, calyx minutely pubescent, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. Rungia sp. n. 11, *Herb. Ind. Or. H. f. & T.* Acanthacea, *Griff. Itin. Notes*, 36, n. 589.

KHASIA MTS., alt. 3000 ft.; *Griffith* (Kew Distrib. n. 6165), *H. f. & T.*

Much branched; branches 10 in., pubescent, or with deflexed hairs. *Leaves* $3\frac{1}{4}$ by $\frac{3}{4}$–$1\frac{1}{2}$ in., cuneate at both ends; petiole $\frac{1}{3}$ in. *Spikes* 1–2 in., terminal and on short lateral branches, quadrifarious; bracts $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., acutely or long acuminate, scarious-margined, nervose; bracteoles $\frac{1}{3}$ in., linear. *Calyx* scarcely $\frac{1}{4}$ in., segments narrowly linear. *Anther-cells* superposed, muticous. *Capsule* $\frac{1}{3}$ in., pubescent, placentæ rising elastically from the base. *Seeds* minutely verrucose.

9. **R. himalayensis,** *Clarke*; leaves long-petioled ovate minutely scabrid-pubescent, spikes slenderly peduncled 4-farious secund, bracts ovate shortly acuminate somewhat pubescent, calyx minutely pubescent, corolla $\frac{1}{4}$–$\frac{1}{3}$ in.

E. NEPAL; Tambur River, alt. 4000 ft., *J. D. H.* SIKKIM, alt. 3–4000 ft.; Dikeeling, *Clarke.*

Stems 1 foot, diffuse, weak, branched, pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$–1 in., cuneate at both ends; petiole $\frac{1}{2}$ in. *Spikes* 1 in.; peduncles $\frac{1}{2}$–1 in.; bracts $\frac{1}{4}$ by $\frac{1}{6}$ in., scarious-margined; bracteoles $\frac{1}{5}$ in., linear. *Calyx* $\frac{1}{6}$ in., segments sublinear. *Anther-cells* superposed, lower muticous or whitened at base. *Ovary* nearly glabrous; style thinly hairy at base. *Capsule* less than $\frac{1}{6}$ in., minutely pubescent; young shortly glandular-verrucose. *Seeds* small, minutely verrucose, appearing punctate.—Differs from *R. repens* in the longer-petioled broader leaves and much smaller capsule and seeds; from *R. apiculata* in the longer petioled leaves, glabrous ovary, and slender peduncles (perhaps hardly sufficiently).

10. **R. linifolia,** *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 469; leaves short-petioled elliptic acute nearly glabrous, spikes peduncled slender 4-farious secund, bracts lanceolate acute, corolla $\frac{1}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 517. Justicia linifolia, *Wall. Cat.* 2447. J. gracilis, *T. Anders. l. c.* 512. Rostellularia gracilis, *Wight Ic.* t. 1541.

W. DECCAN PENINSULA, from the Concan southwards, *Heyne, Wight,* &c.

Stems 6–12 in., slender, minutely pubescent. *Leaves* 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., from ovate to narrow-lanceolate, often apiculate, base cuneate or almost rounded, minutely scabrid or glabrous, lineolate on both surfaces; petiole usually less than $\frac{1}{16}$ in. *Spikes* 1 by $\frac{1}{4}$ in.; peduncles 0–1 in., slender; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., minutely pubescent, green or narrowly scarious-margined, obscurely striate; bracteoles $\frac{1}{8}$ in., linear-lanceolate. *Calyx* $\frac{1}{7}$ in.; segments sublinear, pubescent. One *anther-cell* lower than the other, acute hardly tailed at the base. *Ovary* pubescent, style glabrous except close to the base. *Capsule* not seen.

11. **R. apiculata,** *Bedd. Ic. Pl. Ind. Or.* t. 247; leaves petioled ovate or linear-oblong puberulous on the nerves beneath, spikes peduncled quadrifarious secund, bracts ovate-lanceolate apiculate minutely pubescent, calyx pubescent, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. R. repens, var., *T. Anders. in Thwaites Enum.* 235, *in Obs.*—Rungia sp. n. 8, *Herb. Ind. Or. H. f. & T.*

MTS. of S. DECCAN; Tinnevelly Hills, alt. 4000 ft., *Beddome.* CEYLON; *Thwaites,* C. P. n. 1973.

Stems 6–15 in., diffuse, branched, rooting, minutely pubescent. *Leaves* $2\frac{1}{2}$ by

$\frac{3}{4}$–1 in., cuneate at both ends; petiole $\frac{1}{6}$ in.; leaves very variable, on one branch are seen ovate upper leaves and below them a leaf $1\frac{1}{4}$ by $\frac{1}{6}$ in. *Spikes* $1\frac{1}{2}$ in.; peduncles $\frac{1}{4}$–1 in.; bracts $\frac{1}{4}$ in., narrowly scarious-margined, finely striate; bracteoles $\frac{1}{5}$ in., sublinear. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in., segments sublinear. *Anther-cells* superposed, muticous. *Ovary* hairy, style-base glabrous; young capsule densely hairy. *Capsule* $\frac{1}{3}$ in., pubescent; seeds small, verrucose.

VAR. *compta*; leaves small short-petioled lanceolate.—S. Travancore; *Beddome*. —*Leaves* 1 by $\frac{1}{5}$ in.; petiole $\frac{1}{10}$ in.: spikes in flower, capsule not seen.

12. **R. repens,** *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 472; leaves subsessile oblong-lanceolate scabrid-puberulous, bracts round apiculate nearly glabrous, corolla $\frac{1}{4}$ in., seeds $\frac{1}{16}$ in. diam. concentrically rugose. *Wight Ic.* t. 465; *Dalz. & Gibs. Bomb. Fl.* 196; *T. Anders. in Journ. Linn. Soc.* ix. 518. Justicia repens, *Linn.*; *Roxb. Corom. Pl.* ii. 29, t. 152, and *Fl. Ind.* i. 132; *Wall. Cat.* 2459. Dicliptera repens, *Roem. & Sch. Syst.* i. 171.—*Burm. Thes. Zeyl.* t. 3, fig. 2.

Throughout INDIA, from the Punjab and Bengal to CEYLON; common. (No specimens from the Malay Peninsula.)

A procumbent, rooting, ramous weed; branches quadrangular, pubescent or nearly glabrous. *Leaves* 2 by $\frac{3}{8}$ in., or often smaller narrower; petiole rarely so much as $\frac{1}{8}$ in. *Spikes* 2 by $\frac{1}{3}$ in., appearing often peduncled, the 2 leaves close to their base usually much reduced; bracts closely regularly imbricated 4-farious, spike less 1-sided than in most species; bracts $\frac{1}{4}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., white margin broad prominent; bracteoles $\frac{1}{8}$ in., linear-lanceolate, minutely pubescent. *Calyx* $\frac{1}{8}$ in.; segments linear-lanceolate, pubescent. *Corolla* white, with rose or purple spots. *Anther-cells* superposed, lower white-tailed. *Ovary* glabrous, style thinly hairy at base. *Capsule* $\frac{1}{4}$ in. and upwards, minutely thinly hairy. *Seeds* ovoid, moderately compressed, rugose almost furrowed.

13. **R. elegans,** *Dalz. & Gibs. Bomb. Fl.* 196; stems patently white-hirsute, leaves subsessile ovate acuminate, bracts round ovate apiculate minutely hairy, corolla $\frac{1}{2}$ in. fine blue. R. repens *var.* villosa, *Nees in DC. Prodr.* xi. 472. Justicia repens, *Wall. Cat.* 2459, *letter* B *partly.*

W. DECCAN PENINSULA; Concan and Canara, *Wight, Law, Stocks*, &c.

Possibly a large form of *R. repens*. *Leaves* attaining 3 by $1\frac{1}{2}$ in., nerves beneath prominent, often patently white-hairy. *Spikes* $\frac{1}{2}$–$\frac{2}{3}$ in. broad; bracts large, scarious margin very prominent sometimes coloured purplish. *Capsule* $\frac{1}{4}$ in., thin, very hairy; seeds concentrically furrowed, the ridges very sharp sometimes crested.

14. **R. Beddomei,** *Clarke*; leaves nearly sessile ovate acute subglabrous, spikes slenderly peduncled dense, bracts broadly ovate apiculate nearly glabrous, corolla $\frac{1}{4}$ in.

TENASSERIM; Mooleyit and the Forest Ranges, *Beddome*.

Stems diffuse, branched, puberulous. *Leaves* 2 by $\frac{3}{4}$–1 in., obscurely or not lineolate; petiole $\frac{1}{8}$ in. *Spikes* $1\frac{1}{2}$ by $\frac{1}{3}$ in., appearing to form lax terminal corymbs; uppermost leaves $\frac{1}{4}$ by $\frac{1}{20}$ in.; bracts nearly as of *R. repens*, more densely imbricated, 4-farious, regular. *Capsule* $\frac{1}{8}$ in. *Seeds* very small, minutely verrucose.—The spikes bear considerable resemblance to *R. repens*; but it seems more nearly allied to *R. himalayensis*, which differs in its long-petioled leaves, and slenderer spikes.

15. **R. Brandisii,** *Clarke*; leaves ovate or ovate-lanceolate acuminate at both ends nearly glabrous, bracts all fertile ovate acuminate nearly glabrous, bracteoles boat-shaped acuminate pubescent, corolla $\frac{1}{4}$ in.

TENASSERIM; *Parish, Brandis, Beddome*.

Stems 18 in., nearly glabrous. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{3}$ in., membranous, finely lineolate; petiole 1 in. *Spikes* $1\frac{1}{2}$ by $\frac{1}{3}$ in., terminal and axillary clustered short-peduncled; bracts $\frac{1}{4}$ by $\frac{1}{8}$ in., obscurely 4-ranked, very narrowly marginate; bracteoles $\frac{1}{8}$ in.

Calyx $\frac{1}{6}$ in.; segments linear-lanceolate, pubescent. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{5}$ in., puberulous. *Seeds* small, minutely verrucose.

16. **R. parviflora,** *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 469, *excl. syn.*; leaves small ovate or lanceolate nearly glabrous, bracts dimorphic barren elliptic or oblong subobtuse striate hardly margined, fertile obovate glabrous scarious-margined ciliate, bracteoles elliptic scarcely acute, corolla $\frac{1}{4}$ in. R. repens, *T. Anders. in Journ. Linn. Soc.* ix. 518 *partly, not of Nees.* R. longifolia, *Bedd. Ic. Pl. Ind. Or.* t. 266, *not of Nees.*

S. DECCAN PENINSULA; *Wight* (2011, 2285 Herb. Propr.). CEYLON; *Thwaites* (C. P., nn. 257, 3354).

A small, ramous weed. Lower *leaves* 1 by $\frac{1}{4}$–$\frac{1}{2}$ in., petioled, ovate, upper narrow sometimes linear. *Spikes* $\frac{3}{4}$ by $\frac{1}{4}$ in., nearly all terminal, markedly 1-sided; barren bracts not cuspidate. *Capsule* $\frac{1}{5}$ in.; seeds small, minutely verrucose.—This, the typical *R. parviflora*, Nees, appears a very rare plant; Nees, however, referred numerous specimens with the fertile bracts hairy all over to *R. parviflora*, but which are *R. pectinata*, Nees, as far as the description goes.

VAR. *pectinata*; flowerless bracts mucronate often cuspidate flowering hairy. R. pectinata, *Nees in DC. Prodr.* xi. 470; *Wight Ic.* t. 1547; *T. Anders. in Journ. Linn. Soc.* ix. 517. R. parviflora, *Nees l. c. partly*; *Griff. Notul.* iv. 144; *Dalz. & Gibs. Bomb. Fl.* 195. R. polygonoides, *Nees in Wall. Pl. As. Rar.* iii. 110, and *Cat.* 7181, and in *DC. Prodr.* xi. 471; *Dalz. & Gibs. Bomb. Fl.* 196. Justicia pectinata, *Linn. Amœn. Acad.* iv. 299; *Lamk. Ill.* i. t. 12, fig. 3; *Roxb. Corom. Pl.* ii. 29, t. 153, and *Fl. Ind.* i. 133; *Wall. Cat.* 2458. J. parviflora, *Retz Obs.* v. 9. J. infracta, *Vahl Enum.* i. 155.—Throughout India, from the Himalaya to Ceylon and Pegu, a universal weed.—Usually ramous. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in.; petiole $\frac{1}{8}$ in. *Spikes* 1 by $\frac{1}{4}$ in., terminal and axillary, clustered, subsessile, distinctly 1-sided; barren bracts $\frac{1}{6}$ by $\frac{1}{12}$ in., scarcely margined; fertile $\frac{1}{10}$ in. diam., orbicular, apiculate, scarious-marginate, hairy on back as well as on margins; bracteoles $\frac{1}{10}$ in., elliptic, subacute. *Calyx* $\frac{1}{12}$ in.; segments linear-lanceolate, pubescent. *Corolla* blue or whiteish, upper lip short. *Anther-cells* superposed, lower white-tailed.—The area of this abundant plant should perhaps be extended to Java, &c., but the examples thence (Dicliptera cœrulea, *Blume Bijd.* 791) differ considerably from all the Indian material, which is very uniform in character, the size of the heads and bracts varying a little.

VAR. *muralis*; spikes very dense, barren bracts ovate acute hardly longer than the fertile. R. muralis, *Nees in DC. Prodr.* xi. 470.—S. Deccan Peninsula; *Hohenacker*, n. 18, &c. Chittagong; *J. D. H.*, &c. Distrib. Ava.—Spikes sometimes $1\frac{3}{4}$ by $\frac{1}{6}$ in., densely strobiliform.

VAR. *origanoides*; leaves narrowly lanceolate, spikes dense narrow, barren bracts orbicular scarious-margined very hairy on the back nearly as the fertile. R. origanoides, *Nees in Wall. Pl. As. Rar.* iii. 110, and *Cat.* 7182, and in *DC. Prodr.* xi. 471.—Pegu; *Wallich.*

SPECIES NOT SEEN.

R. MASTERSI, *T. Anders. in Journ. Linn. Soc.* ix. 519; glabrous, leaves long-petioled ovate, spikes terminal ternate or panicled lax, bracts remote alternate spathulate-linear obtuse, corolla small.

ASSAM; banks of R. Soonder, *Masters.*

Herbaceous, larger than the other species of the genus. *Leaves* (including petiole) 5–8 by $1\frac{1}{2}$–2 in., minutely lineolate, pale beneath. *Spikes* 3–6 in., more or less secund, glabrous or pubescent; bracts $\frac{1}{6}$ by $\frac{1}{24}$ in., mostly linear, obtuse, glabrous; bracteoles as the bracts or ovate acute glumaceous. *Corolla* $\frac{1}{3}$ in., glabrous. *Capsule* $\frac{1}{4}$ in., sparsely puberulous or pubescent (T. Anderson).

XLVII. **DICLIPTERA,** *Juss.*

Diffuse herbs. *Leaves* ovate, acute, entire or obscurely undulate. *Inflorescence* cymose, clustered or panicled; proper bracts opposite, unequal,

larger than the calyx (except in *D. parvibracteata*); flowers sessile, opposite, one of each pair usually reduced to a rudimentary calyx and bracteoles; bracteoles linear or linear-lanceolate, as long as the calyx (except in *D. parvibracteata*). *Calyx* sub-5-partite; segments equal, linear-lanceolate, more or less pubescent. *Corolla* red or rose, purple-spotted, tube slender, limb deeply 2-lipped; upper lip entire or emarginate, lower 3-lobed recurved. *Stamens* 2; anthers 2-celled; cells ovoid, superposed, muticous. *Ovary* 4-ovulate; style filiform, shortly bifid. *Capsule* clavate, stalk solid; placentae rising elastically from their base. *Seeds* ovoid, compressed, glabrous, verrucose or glandular subpapillose.—Species 60, tropics of both Hemispheres.

Justicia chinensis, *Vahl, Roxb. Fl. Ind.* i. 124, *Wall. Cat.* 2466 (type sheet), has been long cultivated at Calcutta, having been introduced from China or Malaya; it looks like an enlarged or garden form of *D. Burmanni,* noticed below under *D. Leonotis,* Dalz.

* *Inflorescence panicled,* i. e. *each pair of bracts mostly long-petioled.*

1. **D. parvibracteata,** *Nees in Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 488; leaves ovate acuminate nearly glabrous, bracts $\frac{1}{16}$ in. linear. Justicia retorta, *Vahl Enum.* i. 150 ? J. latebrosa, *Koen.*; *Roxb. Fl. Ind.* i. 125.

MADRAS; Circars, *Wight* (Herb. Propr. n. 51 or 2014); Vizagapatam (Jaipoor Hills), *Beddome.*

Stem diffuse, striate, obscurely pubescent upwards. *Leaves* 5 by $2\frac{3}{4}$ in. (or all except the lowest small, 1–2 in.), base shortly acuminate; petiole 1 in. *Panicle* 6 in., divaricate, lax, nearly glabrous; floral leaves at the bifurcations $\frac{1}{10}$–$\frac{1}{4}$ in., linear-lanceolate; bracteoles $\frac{1}{16}$ in., linear. *Calyx* $\frac{1}{16}$ in., sub-5-partite; segments linear-lanceolate, minutely pubescent. *Corolla* $\frac{1}{3}$ in., slender, minutely pubescent. *Capsule* $\frac{1}{4}$ in., clavate, pubescent; placentae rising elastically.—Justicia latebrosa, *Koen.*, has never been satisfactorily recovered. The Ic. Ined. of this at Kew is *D. parvibracteata*; a separate imperfect drawing of a capsule added in the corner perhaps not pertaining. But Roxburgh's description does not suit in several points, of which "Flowers large" is difficult to get over. A scrap in Wallich's Herbarium, marked in old handwriting "*Justicia latebrosa,* Roxb.," is *Dicliptera cuneata.*

2. **D. Beddomei,** *Clarke*; leaves ovate acuminate minutely pubescent, bracts $\frac{1}{3}$ in. linear-oblong suddenly mucronate ciliate.

N. MADRAS; Nallaymallays (in Kurnool), *Beddome.*

Stems diffuse, striate, glabrous except the tips. *Leaves* $5\frac{1}{2}$ by $3\frac{1}{4}$ in., pubescent beneath or nearly glabrous, base acuminate; petiole 2 in. *Panicle* 6 in., lax branches often patently white-hairy; floral leaves at the bifurcations gradually reduced, uppermost linear; bracteoles $\frac{1}{6}$ in., linear-lanceolate. *Corolla* $\frac{3}{4}$ in., minutely pubescent. *Capsule* nearly $\frac{1}{3}$ in., clavate, pubescent; placentæ rising elastically from the base. *Seeds* verrucose.

3. **D. Kurzii,** *Clarke*; patently white-hairy, leaves lanceolate, bracts $\frac{1}{2}$ in. linear-lanceolate hirsute glandular-hairy. D. speciosa, Var. β only, *Kurz in Journ. As. Soc.* 1873, pt. ii. 97.

PEGU; *Kurz.*

Stem stout, striate, patently white-hairy. *Leaves* 5 by $1\frac{1}{2}$ in., acuminate at both ends, thinly hairy on both surfaces; petiole $\frac{1}{4}$ in. *Panicle* 6–15 in., divaricate, lax, patently white-hairy; bracts and bracteoles with glandular hammer-headed hairs, and also white-hirsute. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., slender, minutely hairy. *Capsule* $\frac{1}{3}$ in., clavate, pubescent, placentæ rising elastically. *Seeds* verrucose.—Placed doubtfully as a var. of *D. speciosa* by Kurz; the inflorescence is different, and the corolla is considerably smaller.

4. **D. speciosa,** *Kurz in Journ. As. Soc.* 1873, pt. ii. *Var. a only*; leaves large lanceolate thinly hairy on both surfaces, bracts $\frac{1}{3}$–$\frac{1}{2}$ in. spathulate-oblong obtuse hirsute glandular-hairy.

PEGU; *Kurz.*

Stem terete, glabrous, except towards the top. *Leaves* 8 by $2\frac{1}{2}$ in., acuminate at both ends; petiole $1\frac{1}{2}$ in. *Cymes* 1–$1\frac{1}{2}$ in., axillary, often several together, sometimes from the lower axils; mostly subsimply umbelled, rarely compound; floral leaves $\frac{1}{3}$ in., linear; proper bracts $\frac{1}{8}$ in. broad, on cinereous-pubescent peduncles $\frac{1}{3}$ in. long. *Corolla* nearly 1 in., lower lip broad. *Capsule* (immature) clavate, minutely glandulose-pubescent, 4-seeded.

5. **D. zeylanica,** *Nees in DC. Prodr.* xi. 474; leaves ovate acuminate minutely scabrid or glabrate, bracts ovate or elliptic mucronate glabrous or minutely pubescent. D. bivalvis, *Nees l. c.* 475 (*as to the Indian material*); *Dalz. & Gibs. Bomb. Fl.* 196; *Wight Ill.* t. 164 b, fig. 10, and *Ic.* t. 1551; *T. Anders. Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 519, *not of Juss.*

W. DECCAN PENINSULA from the Concan southward, and CEYLON; frequent.

Stem glabrous, sometimes pubescent or densely woolly. *Leaves* attaining 5 by $2\frac{1}{2}$ in., base shortly acuminate; petiole $\frac{3}{4}$ in. *Inflorescence* variable; in the type of Wight running into terminal panicles, upper floral leaves linear, peduncles $\frac{1}{4}$–1 in.; more often cymes axillary, abbreviated, peduncles ternate; or peduncles subobsolete, or the inflorescence reduced to one pair of bracts; bracts $\frac{1}{2}$ in. broad in the type specimen, often only $\frac{1}{4}$ in. broad, never acuminate, either cuneate or subobtuse mucronate, frequently nervose; bracteoles small, linear-lanceolate. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., clavate, pubescent. *Seeds* minutely verrucose.—Dicliptera bivalvis, *Juss.*, is exactly Justicia bivalvis, *Linn.*; which, in so far as it relates to any Indian plant, is founded on *Rheede Hort. Mal.* ix. t. 43, which cannot represent the present plant (and may be *Peristrophe montana*). *D. bivalvis*, Juss., can, therefore, not even *partim* be the present *D. zeylanica.*

** *Inflorescence clustered subcapitate*, i. e. *each pair of bracts, subsessile or very shortly petioled* (see also 5, *D. zeylanica*).

6. **D. cuneata,** *Nees in Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 481; leaves ovate acuminate glabrous, flower-clusters often long-peduncled, bracts obovate elliptic or cuneate apiculate or mucronate nearly glabrous. *Wight Ic.* t. 1552; *T. Anders. in Journ. Linn. Soc.* ix. 521. Justicia umbellata, *Wall. Cat.* 2467.

S. MADRAS; *Wight*, &c.; Tinnevelly, *Beddome.*

Pairs of bracts on short peduncles 0–$\frac{1}{6}$ in., often 3–8 together forming a subcapitate cluster; these clusters often on a peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in., floral leaves supporting the cluster usually reduced, narrow.—Otherwise very near the glabrous forms of *D. zeylanica* with congested inflorescence: both T. Anderson and Beddome have, however, treated the species as distinct.

7. **D. reptans,** *Nees in DC. Prodr.* xi. 483; leaves elliptic acuminate puberulous beneath, flower-clusters axillary subsessile, bracts elliptic acute mucronate softly pubescent.

MERGUI; *Griffith.*

Stems procumbent, rooting; branches 6–10 in., erect, puberulous. *Leaves* 3 by 1 in., base shortly acuminate; petiole $\frac{1}{4}$ in. *Peduncles* to the flower-clusters 0–$\frac{1}{8}$ in.; floral leaves $\frac{1}{8}$ in., linear; peduncles to the pairs of bracts 0–$\frac{1}{8}$ in., minutely pubescent; bracts nearly $\frac{1}{2}$ by $\frac{1}{3}$ in., 1-nerved; secondary nerves oblique, subprominent. *Corolla* $\frac{1}{2}$ in., slender.—*Capsule* not seen; and anther-cells rather long for a *Dicliptera*; it is possibly a *Peristrophe* (as Griffith marked it in the field), and greatly resembles *P. acuminata* var. *fragilis*, except that the flower is smaller.

8. **D. micranthes,** *Nees in Wall. Pl. As. Rar.* iii. 112, and in *DC. Prodr.* xi. 484, *excl. syn.*; leaves ovate acuminate nearly glabrous, flower-clusters mostly in axillary whorls, bracts oblong somewhat obovate cuspidate ciliate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 521.

CENTRAL INDIA, alt. 1–3000 ft.; from Behar (*J. D. H.*) and Chota Nagpore to the Concan, frequent.—DISTRIB. Abyssinia.

Branches striate, puberulous or glabrate. *Leaves* 4 by 1¼ in., base shortly acuminate; petiole 1½ in. *Bracts* ⅓ by 1/12 in., often nearly glabrous except the densely white ciliate margins. *Corolla* scarcely exceeding ¼ in., very slender. *Capsule* ⅙ in., clavate, very shortly stalked, membranous, glabrous except the minutely hairy tip. *Seeds* very small, conspicuously verrucose.

9. **D. Leonotis,** *Dalz. ms.*; leaves elliptic acuminate glabrous, flower-clusters mostly in axillary whorls, bracts oblong-lanceolate acuminate cuspidate minutely pubescent. D. Burmanni, *Nees in Wall. Pl. As. Rar.* iii. 112, and in *DC. Prodr.* xi. 483 *partly, not of T. Anders.*; *Dalz. & Gibs. Bomb. Fl.* 196?. Justicia chinensis, *Wall. Cat.* 2466, *letter* C *partly.*

DECCAN PENINSULA?; *Wight* (Herb. Propr. n. 2016). GOOJERAT and AJMERE, *Dalzell.*

Closely allied to *D. micranthes,* but the bracts, flowers, capsules and seeds considerably larger. *Leaves* 3 by 1 in.; petiole ⅓ in. *Bracts* ½ by ⅛ in., much acuminate. *Corolla* ⅔ in. *Capsule* ¼ in., very hairy. *Seeds* much larger than in *D. micranthes*, minutely glandulose-papillose, scarcely verrucose.—Nees grounds his *D. Burmanni* on Burmann's figure of a Java species; this is D. Burmanni, *T. Anders. in Journ. Linn. Soc.* ix. 520. In founding the species, Nees states he had only seen one specimen, viz. Wight n. 2016, which sheet named by Nees' hand is at Kew; but it is not the plant figured by Burmann.

10. **D. riparia,** *Nees in Wall. Pl. As. Rar.* iii. 112, and *Cat.* 7183, and in *DC. Prodr.* xi. 480; leaves ovate acuminate glabrous or pubescent, flower-clusters terminal and axillary subverticillate, bracts narrowly obovate obtuse hairy ciliate, corolla ⅔ in. *T. Anders. in Journ. Linn. Soc.* ix. 520.

PEGU and TENASSERIM; *Wallich, Griffith, M'Lelland,* &c.

Branches elongate. *Leaves* 4½ by 1½–2½ in., base shortly acuminate; petiole 1½ in. *Flowers* subsessile; bracts unequal, similar, larger ⅓ by ⅙ in.; bracteoles ¼ in., linear. *Calyx* ⅛ in.; segments linear, nearly glabrous. *Capsule* ¼ in., clavate, nearly glabrous. *Seeds* minutely papillose, hardly verrucose.—Perhaps only a form of *D. Roxburghiana,* differing in the softly pubescent flower-clusters, and the very obtuse often emarginate bracts. The numerous examples are exactly alike, but come from one neighbourhood.

11. **D. Roxburghiana,** *Nees in Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 483, *excl. syn.*; leaves elliptic acute obscurely pubescent or glabrate, flower-clusters axillary and terminal sessile more rarely shortly peduncled, bracts cuneate-elliptic or obovate apiculate not acuminate. *T. Anders. in Journ. Linn. Soc.* ix. 519, *partly*; *Dalz. & Gibs. Bomb. Fl.* 196?. Justicia chinensis, *Wall. Cat.* 2466, *letter* D, and *part* B, C.

Plains of N. INDIA, from the Punjab to Assam, Silhet and E. Bengal, frequent. BHOTAN; *Griffith.*

Stems 1–3 ft., elongate, nearly glabrous. *Leaves* 2½ by 1 in., base cuneate; petiole ¼ in. *Bracts* nearly ⅓ by ⅛ in., often 3-nerved, ciliate, thinly pubescent. *Corolla* ¾ in. *Capsule* ¼ in., clavate, puberulous or glabrous. *Seeds* conspicuously verrucose.—The whole of the plains form of *D. Roxburghiana* differs from Var.

bupleuroides in the broader, more or less obovate, bracts. Nees founded his species on the common Assam and E. Bengal plant, and the original ticket on his type specimen is marked Assam. Bentham, however (in Fl. Hongk. 266), says this was an error, and that this type specimen came from the Calcutta Botanic Garden; but it is not known how Bentham discovered this. Nees, however, is in error in citing Roxburgh's *Justicia chinensis*, for Roxburgh's Ic. Ined. proves this to have been the true plant, long cultivated at Calcutta.

VAR. *bupleuroides*, Nees in Wall. Pl. As. Rar. iii. 111, and in DC. Prodr. xi. 485, excl. syn. Roxb. (sp.); leaves ovate or elliptic acute or acuminate glabrous or somewhat pubescent, flower-clusters dense axillary and terminal mostly sessile, bracts linear or linear-oblong nearly parallel-sided acuminate cuspidate. D. cardiocarpa, *Nees in Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 480. D. hirtula, *Nees in DC. Prodr.* xi. 485. D. Roxburghii, *T. Anders. in Journ. Linn. Soc.* ix. 519, *chiefly*. D. Roxburghiana, *Boiss. Fl. Orient.* iv. 526, *not of Nees*. D. rupestris, *Nees in DC. Prodr.* xi. 486. D. crinita, *Nees l. c.* 485, *as to the Indian examples so named by Nees*. Justicia chinensis, *Wall. Cat.* 2466, *letter* B, C *partly*; *Roxb. Fl. Ind.* i. 125, *Obs. only*. J. canescens, *Wall. Cat.* 2423.—Throughout India in the hills, alt. 1–6000 ft., abundant in the north, becoming rare in the Malabar Ghauts; in the Himalaya from Kashmir to Upper Assam and the Chittagong Hills; Mt. Aboo, *Stocks*; Central India. Distrib. Affghanistan.—A large very uniform series, varying only slightly in the pubescence of the bracts. In the extreme forms the bracts are $\frac{3}{4}$ by $\frac{1}{16}$ in., glistening ciliate, and in some of Beddome's Malabar specimens they are almost subulate. Though the bracts are often broader than in these, the plant as a whole is tolerably well separable from *D. Roxburghiana*.

XLVIII. **PERISTROPHE,** *Nees.*

Erect, spreading herbs. *Leaves* entire. *Flower-clusters* axillary or terminal, often panicled by the reduction of the floral leaves; bracts 1–4 together, linear or ovate, longer (rarely shorter) than the calyx; bracteoles linear-lanceolate, shorter than the bracts. *Calyx* deeply 5-lobed; segments equal, linear-lanceolate. *Corolla* rose or purple; tube slender, limb deeply 2-lipped, upper lip subentire, lower very shortly 3-lobed. *Stamens* 2; filaments pubescent below; anthers 2-celled, cells linear (or in *P. bicalyculata* ovoid), muticous, one higher than the other or distant. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* ellipsoid, stalked, usually 4-seeded, more or less dusky pubescent. *Seeds* ovoid, compressed, glabrous, minutely glandular-papillose, scarcely verrucose.—Species 15, from Tropical and S. Africa to New Caledonia and S. Japan.

1. **P. bicalyculata,** *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 496; thinly patently hairy, leaves ovate acuminate, panicle lax divaricate, bracts linear or linear-spathulate acute mucronate, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 521. P. Kotschyana, *Nees l. c.* 197. Justicia bicalyculata, *Vahl Symb.* ii. 13; *Roxb. Fl. Ind.* i. 126; *Blume Bijd.* 783; *Wall. Cat.* 2457. J. ligulata, *Lamk. Ill.* t. 12, fig. 2; *Cav. Ic.* t. i. 52, t. 71. Dianthera malabarica, *Linn. f. Suppl.* 85. D. bicalyculata, *Retz in Act. Holm.* 1775, 297, t. 9, and *Obs.* i. 10. Ruellia paniculata, *Linn. Herb.*

TROPICAL and SUBTROPICAL INDIA; from the Punjab and Scinde to Assam, Pegu and Madras, very common; not known from Ceylon.—DISTRIB. Tropical Africa.

Leaves 2 by 1 in.; petiole $\frac{1}{4}$ in. Each pair of proper *bracts* long-petioled; bracts $\frac{1}{3}$ by $\frac{1}{20}$ in., unequal. *Anther-cells* ovoid, remote, resembling those of *Dicliptera*, not of other *Peristrophes*. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. *Seeds* minutely glandular-papillose.

VAR. *rivinoides*; young inflorescence axillary very short-peduncled capitellate. P. rivinoides, *Wall. Cat.* 2488. P. bicalyculata, Var. *β, Nees ms. in Wight Herb. Prcpr.* n. 2018 c.—S. India.

2. **P. undulata,** *Nees in DC. Prodr.* xi. 496; puberulous, leaves lanceolate undulate, panicles small close, bracts linear-lanceolate, corolla ¾ in. Justicia undulata, *Vahl Symb.* ii. 8, *excl. syn.*

MALABAR (*Koenig*, fide *Vahl*). NILGIRIS; *Beddome.*

Leaves 2¾ by ⅔ in., attenuate at both ends, sinuate, in Beddome's examples variegated; petiole ⅓ in. *Panicle* 1–2 in. diam., terminal, hardly exceeding the upper leaves; bracts ½–⅔ by 1/12 in., 2 or 3–4 together, 2–4-fid., lineolate, nearly glabrous. *Corolla* purple-red, tube ⅓ in., limb ⅓ in., lobes 2 very shortly toothed. *Anther-cells* linear, one placed close above the other. *Capsule* not seen.—This appears closely allied to *P. acuminata*, as Nees states.

3. **P. acuminata,** *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 496; leaves narrowly lanceolate nearly glabrous, panicles compact, bracts ½ by 1/18 in. glabrous, corolla ¾ in. *T. Anders. in Journ. Linn. Soc.* ix. 521. P. Blumeana, *Nees l. c.* 495. Justicia acuminata, *Wall. Cat.* 2425, *sheet* B *partly.*

TAVOY; *Wallich.* MALACCA; *Griffith.*—DISTRIB. Java.

Leaves 3 by ⅔ in., acuminate at both ends, lineate on both surfaces, minutely pubescent on the midrib beneath or glabrous; petiole ¼ in. *Bracts* 2–4 together, ½ in. long or in other cymes of the same branch scarcely ⅛ in. *Anther-cells* linear, one slightly overlapping the other, upper usually narrower curved. *Capsule* ⅓–½ in., nearly glabrous.—The plants here collected under *P. acuminata* are separated from *P. montana* by the much smaller corolla, and possibly include 2 or more species; but the material is insufficient. As noted by Nees, some of the specimens show great variation in the bracts on one branchlet; yet species have been founded on characters almost wholly drawn from them. In justification of throwing the species into one, it may be observed that the Malacca plant marked *P. acuminata* by T. Anderson is identical with the Java plant marked *P. Blumeana* by Nees; but there is no specimen from Burma (much less from Khasia) that matches this, as might be inferred from Nees and T. Anderson: and Miquel's *P. acuminata* from Java is very unlike *P. acuminata*, Nees.

VAR. *fragilis*; leaves larger ovate-lanceolate, bracts ⅜ by ⅛ in. broadly lanceolate glabrous. P. gracilis, *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 495, and in *Wall. Cat.* 7184; *T. Anders. in Journ. Linn. Soc.* ix. 522. Justicia acuminata, *Wall. Cat.* 2425, *sheet* B *partly.*—Tavoy; *Wallich.* Rangoon; *M'Lelland.* Mergui; *Griffith.*—*Leaves* 5 by 2 in.; nerves many, pubescent; uppermost leaves linear-lanceolate.—The Tavoy example marked by Nees *fragilis* is identical with some of that marked by him *acuminata.*

VAR. *khasiana*, bracts all small ⅛ in. fuscous-pubescent. Justicia acuminata, *Wall. Cat.* 2425, *letter* A *right-hand fragments.*—Khasia Mts.; *Wallich.*—This does not look like a *Peristrophe*, but the corolla and stamens are exactly as in *P. acuminata*, type.

4. **P. lanceolaria,** *Nees in Wall. Pl. As. Rar.* iii. 114, and in *DC. Prodr.* xi. 496; leaves lanceolate or ovate-lanceolate nearly glabrous, panicles densely glandular-pubescent, bracts ⅜ in. linear-lanceolate, corolla 1¾ in. *Bot. Mag.* 5566; *T. Anders. in Journ. Linn. Soc.* ix. 522. Justicia lanceolaria, *Roxb. Fl. Ind.* i. 121; *Wall. Cat.* 2463.

SILHET and JAINTEAPOOR, alt. 500 ft.; *Wallich*, &c., frequent. MOULMEIN; *Parish.* TENASSERIM; *Beddome.*

Leaves 5½ by 2 in., acute at both ends, pubescent on the nerves beneath or glabrate, obscurely or not lineolate; petiole ⅜ in. *Panicles* strict, branches erect. *Calyx* ¼–⅓ in.; segments sublinear. *Anther-cells* linear-oblong, immediately superposed.

Capsule ⅝ in., viscous-pubescent.—A strongly marked species; the Moulmein plant (*P. grandiflora*, Parish ms.) has the flowers hardly larger than in some examples from Silhet.

5. **P. speciosa,** *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 495; leaves ovate-lanceolate or elliptic acute nearly glabrous, floral leaves mostly large, bracts linear-oblong not acute nearly glabrous many widened upwards, corolla 1¾ in. *T. Anders. in Journ. Linn. Soc.* ix. 521. Justicia speciosa, *Roxb. Fl. Ind.* i. 122; *Bot. Mag.* t. 2722; *Wall. Cat.* 2464; *Lodd. Bot. Cab.* t. 1915.

SUBTROPICAL HIMALAYA, alt. 1–5000 ft., from Kumaon to Bhotan, frequent; *Wallich*, &c. SILHET STATION; *Clarke*.

Leaves 5 by 2 in., base rhomboid or acute; petiole 1 in. *Floral leaves* often 1–2 in., so that the flower-clusters often appear terminal or axillary subcapitate rather than panicled; bracts ⅔ by ⅛–⅙ in., subobtuse, sometimes spathulate, tips often recurved. *Anther-cells* linear-oblong, one superposed half its length.

6. **P. montana,** *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 493, *partly*; leaves elliptic acuminate at both ends subglabrous, bracts large elliptic glabrous nervose, corolla 2¼ in. *Wight Ic.* t. 1553; *T. Anders. in Journ. Linn. Soc.* ix. 521. Justicia sylvestris, *Wall. Cat.* 2468.

W. DECCAN PENINSULA from the Concan southward, and CEYLON, frequent; *Wight*, &c.

Leaves 5½ by 1¾ in., raphides very slender on both surfaces; petiole 1¼ in. *Bracts* ¾ by ⅓–½ in., obtuse or minutely apiculate, not acuminate. *Filaments* pubescent; anther-cells linear, one half its length below the other.—Described from Wight, Herb. Propr. n. 2017, its type (named in Nees' hand); and includes all the S. Indian examples of Nees and T. Anderson, *not* their Khasi material.

7. **P. tinctoria,** *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 493?; dusky-puberulous, leaves short-petioled ovate subacute not large, bracts elliptic subacute nervose not ciliate, corolla 1¼ in. slender. *T. Anders. in Journ. Linn. Soc.* ix. 521, *partly*. Justicia tinctoria, *Roxb. Fl. Ind.* i. 123; *Wall. Cat.* 2465. J. Roxburghiana, *Roem. & Sch. Syst. Mant.* i. 140.

INDIA; cultivated frequently from Assam to CEYLON.—DISTRIB. Malaya, S.E. Asia; where wild not known.

Leaves 2–3 by 1–1¼ in.; lower petioles rarely exceeding ¼ in., dusky-puberulous. *Bracts* ¾ by ⅓ in., somewhat nervose, dusky-puberulous. *Anther-cells* linear, one superposed for half its length. *Capsule* hardly ½ in., shortly stalked.—A well-marked cultivated form, described from Roxburgh's and Wallich's specimens. Nees has diagnosed his *P. tinctoria* so as expressly to exclude (by the ciliate bracts, &c.) all the examples; so that the name *P. tinctoria*, Nees, can only be understood to refer to some of Nees' synonyms. The figure of Dianthera japonica, *Thunb. Fl. Jap.* 21, t. 4, cited by Nees for this species, is a *Dicliptera*, and with it much of Nees' synonymy falls to the ground.

8. **P. fera,** *Clarke*; leaves long-petioled ovate-lanceolate acuminate more or less pubescent, bracts elliptic often elongate nervose ciliate often hairy, corolla 1¾ in. P. montana, Var. β sylvestris, *Nees in DC. Prodr.* xi. 493 (as to the N. Indian examples). P. tinctoria, *Nees l. c. as to descr. only*; *T. Anders. in Journ. Linn. Soc.* ix. 521, *chiefly*. Justicia acuminata, *Wall. Cat.* 2425, *left example on type sheet*.—Peristrophe sp., *Griff. Itin. Notes*, 36, n. 596.

EASTERN FRONTIER Bhotan, *Griffith*. ASSAM and KHASIA MTS., alt. 1–4000 ft., common, *H. f. & T.*, &c.

Leaves 4½ by 1¾ in.; raphides obscure or 0; petiole (of the middle cauline leaves) often exceeding 1 in. *Bracts* ⅜ by ¼ in., often obtusely acuminate. *Corolla* much broader than in *P. tinctoria*.—Possibly the wild form of *P. tinctoria*. Nees, after diagnosing his *P. montana* as having non-ciliate bracts, has thus named examples of *P. fera* with intensely ciliate bracts.

VAR. *intermedia*; bracts more hairy, flowers smaller.—Chittagong, alt. 1000 ft.; *H.f. & T.* Pegu; *Kurz.* Tenasserim; *Beddome.*—This has been named P. *jalappæfolia*, Nees, but the corolla is much smaller than in the Malay examples of that species. It is suspiciously intermediate between the *P. acuminata* var. *fragilis* and *P. fera*; and both plants were collected by Beddome on the slopes of Mooleyit in Tenasserim; the corolla is the same size in both, and the only difference between them is that in Var. *intermedia* the bracts are ¼ in. broad and hairy, but in *P. acuminata* var. *fragilis* ⅛ in. broad and glabrous.

XLIX. **HYPOESTES,** *R. Br.*

Herbs or shrubs. *Leaves* entire or toothed. *Flower-clusters* spiked, capitellate or rarely solitary; bracts 2–4 together, free or united at base, enclosing 1–4 flowers, of which all but 1 are usually reduced or obsolete; bracteoles shorter than the bracts, narrow. *Calyx* very small (or in *H. lanata* nearly equalling the bracteoles), deeply 5-lobed, scarious or membranous; segments linear-lanceolate. *Corolla* pink purple or white (in the Indian species); tube slender, limb 2-partite; upper lip subentire, lower very shortly 3-lobed. *Stamens* 2; anthers 1-celled, muticous. *Ovary* 4-celled? ; style filiform, scarcely bifid at the tip. *Capsule* ellipsoid, stalked, usually 4-seeded. *Seeds* ovoid, compressed, glabrous, in the Indian species verrucose.—Species 70, from Tropical and S. Africa, the Himalaya, China and Australia.

Hypoestes purpurea, *R. Br.*, *Nees in Wall. Pl. As. Rar.* iii. 114 (Justicia purpurea, *Wall. Cat.* 2473), is a Malay Archipelago plant, cultivated from long ago in Bengal.

1. **H. lanata,** *Dalz. in Hook. Kew Journ.* ii. 343; leaves elliptic acuminate entire nearly glabrous, spikes elongate interrupted softly hairy axillary and running into large terminal panicles, bracts distinct linear, corolla 1 in. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 522.

CONCAN GHAUTS; *Law, Dalzell.*

An undershrub. *Leaves* 5 by 1¾ in., minutely lineolate on both surfaces; petiole ¾ in., sometimes winged. *Spikes* 6 in. and upwards; flowers mostly in opposite distant clusters, each cluster consisting of 1–3 bracts and 1 (with 1 or 2 reduced) flower: bracts ½–¾ in., very hairy. *Calyx* ⅓ in., hairy. *Capsule* nearly ⅜ in., stalked, pubescent. *Seeds* verrucose.—Habit very remote from *Hypoestes*, superficially resembling *Strobilanthes perfoliatus*, but the corolla and stamens are typical *Hypoestes*.

2. **H. triflora,** *Roem. & Sch. Syst.* i. 88; leaves ovate somewhat hairy on both surfaces, flower-clusters capitellate axillary and terminal, bracts narrowly obovate subobtuse, corolla scarcely ½ in. *Nees in DC. Prodr.* xi. 506; *T. Anders. in Journ. Linn. Soc.* ix. 522. H. Wallichii, *Nees in Wall. Pl. As. Rar.* iii. 114. Justicia chinensis, *Wall. Cat.* 2466, *letter* E.

NEPAL; *Wallich*; Tambur River, alt. 1–3000 ft., *J. D. H.* SIKKIM and BHOTAN, alt. 4–7000 ft., *Clarke, Griffith.*—DISTRIB. Abyssinia.

Herbaceous, ramous. *Leaves* attaining 3½ by 2 in., mostly much smaller, crenate or denticulate, sparsely hairy above, pubescent beneath; petiole 1½ in. *Flower-clusters* 1–5 (often 3) together, subsessile; bracts opposite, paired, flower in one of each pair nearly always 0 or much reduced; bracteoles ¼–⅓ in., linear-lanceolate,

nearly as long as the bracts. *Calyx* ⅛ in. *Corolla* pink or white. *Capsule* ⅓ in., nearly glabrous. *Seeds* verrucose.—The placentae tend to rise elastically, and the inflorescence also draws this plant very close to *Dicliptera*.

3. **H. malaccensis,** *Wight Ic.* t. 1555; leaves elliptic acuminate pubescent beneath, flower-clusters numerous capitate, bracts lanceolate acute connate at base, corolla ¾ in. slender. *T. Anders. in Journ. Linn. Soc.* ix. 522. H. Decaisneana & laxiflora, *Nees in DC. Prodr.* xi. 508.

MALACCA; *Griffith, Capt. A. C. Wight, Maingay.*

Branches herbaceous, diffuse, minutely pubescent. *Leaves* 2½ by 1 in., petiole ⅓ in. *Inflorescence* dense, minutely ashy-pubescent; bracts ½–⅔ in., several connate into a tube, enclosing 1–4 flowers, of which all but 1 are usually rudimentary; bracteoles ¼ in., linear, scarious. *Calyx* scarcely ⅛ in., membranous. *Capsule* nearly ⅓ in.—This extends, with slight variation in size of corolla and degree of union of the bracts, throughout the Malay Archipelago to the Philippines.

ORDER CX. SELAGINEÆ. (By J. D. Hooker.)

Herbs or shrubs. *Leaves* alternate or the lower opposite, entire or toothed. *Flowers* small, solitary or spicate, irregular, 2-sexual. *Calyx* inferior, spathaceous or tubular and 2–5-fid or -partite, imbricate in bud. *Corolla* monopetalous, tube entire or split, limb 2-lipped or 4–5-lobed, imbricate in bud. *Stamens* inserted on the corolla-throat or -lobes, 2, or 4 with a rudimentary 5th, filaments filiform; anther-cells confluent. *Ovary* free, 2-celled; style simple, terminal, stigma subcapitate or 2-lobed; ovules 1 pendulous from the top of each cell, anatropous. *Fruit* small, 2-celled, indehiscent or of 2 cocci, one often imperfect. *Seeds* pendulous; embryo straight in the axis of fleshy albumen; cotyledons ½-cylindric, radicle superior.—DISTRIB. Species 140, all S. African, except the European genus *Globularia* and the following.

LAGOTIS, *Gaertn.* (GYMNANDRA, *Pall.*)

Perennial fleshy herbs. *Leaves* radical and cauline, entire crenate or incised. *Flowering branches* scape-like, ascending, leafy above. *Flowers* spicate or capitate, bracteate, blue or purple, ebracteolate; bracts usually broad, imbricating, as long or longer than the flowers. *Calyx* spathaceous or of 2 sepals. *Corolla-tube* curved; limb 2-lipped, lower lip 2–4-lobed. *Stamens* 2, inserted on the corolla-throat; anthers very large, reniform. *Ovary* 2-celled; style slender, jointed at the base, stigma capitate or 2-fid. *Drupe* small, 2-celled, 1–2-seeded, sometimes separable into 2 indehiscent cocci.—DISTRIB. Species 4 or 5, Arctic Regions and Mts. of N. Asia and N.W. America.

L. stolonifera, Koch (Gymnandra), a species found from Armenia to Affghanistan, has been collected in Wazuristan, alt. 5–7000 ft., by Stewart, close to the British frontier. It may be known by its small size, narrow leaves, and long stolons.

* *Calyx of 2 oblong sepals.*

1. **L. globosa,** *Kurz in Journ. As. Soc.* xxxix. 2, 80, t. 7, f. 1 (Gymnandra); leaves long-petioled oblong pinnatifid, scape almost naked, bracts much larger than and concealing the flowers suborbicular densely imbricate forming a globose head.

WESTERN TIBET; Therichan Pass, alt. 15–16,000 ft., *Heyde*; Gilgit, *Col. Turner* (*fid. C. B. Clarke*).

Rootstock slender. *Leaves* few, cut to the midrib; lobes linear-oblong, widened towards their obtuse or notched tips; petiole 2–3 in. *Scape* slender, shorter than the leaves, with a few leafy bracts at the tip. *Heads* 1–1½ in. diam., like a double rose; outer bracts ½ in., orbicular-obovate, concave (when dry membranous), inner narrower. *Flowers* ¼ the length of the bract. *Sepals* obovate-oblong, one obtuse, the other 2-toothed. *Filaments* slender, as long as the upper lip; anthers small for the genus. *Style* included, stigma notched. *Fruit* ⅙ in. long, ellipsoid.

2. **L. decumbens,** *Ruprecht Sert. Thianschan,* 64; leaves long-petioled ovate or oblong coarsely crenate, scape few-leaved, bracts much larger than and concealing the flowers broadly ovate densely imbricate forming an oblong head.

WESTERN TIBET; Karakoram, alt. 16–18,000 ft., *Thomson, Henderson*; Karakash Mts., *Stewart.*—DISTRIB. Thianschan Mts.

Rootstock small. *Leaves* 1–1½ in., obtuse, base cuneate; petiole 2–4 in., tapering downwards. *Flowering stems* ascending, longer than the leaves, with a few leafy bracts near the top. *Spike* 1½–2 in.; bracts ⅓ in. long, entire, obtuse, membranous. *Flowers* ⅙ in. long. *Sepals* as in *L. globosa*. *Lower corolla-lip* 3- or 4-cleft. *Anthers* subsessile. *Style* short, included, stigma notched. *Fruit* narrowly oblong.

** *Calyx very large, spathaceous, hooded, concealing the corolla, acute, nerves meeting in the tip.*

3. **L. Clarkei,** *Hook. f.*; stem ascending leafy, leaves elliptic-ovate acute irregularly toothed, spike elongate, calyx longer than the bract.

SIKKIM HIMALAYA; Yakla, alt. 16,000 ft., *Clarke.*

Stems or *branches* 6–8 in., stout, flexuous. *Leaves,* radical long-petioled; cauline 2–3 in., sessile; nerves many, strong, reticulate. *Spike* recurved; bracts ¾ in., toothed. *Calyx* twice as long, ovate-lanceolate, complicate, open by a narrow slit in front nearly to the base, veined. *Corolla* half as long, lips very short, subequal, recurved, upper dilated at the hooded tip, lower obtusely 3-lobed? *Filaments* adnate to the margins of the upper lip. *Ovary* slender; style exserted, stigma 2-fid.—A very remarkable plant, more caulescent than its congeners. The specimens are very bad, and the description of the corolla may want correction. I found at Tungu (in N. Sikkim) what I take to be young plants of this, judging from the reticulate nervation of the leaves.

*** *Calyx spathaceous, dorsally plane,* 2-*nerved*; *nerves ending apart in the terminal lobes or teeth.*

4. **L. glauca,** *Gaertn. in Nov. Comm. Petrop.* xiv. 533, t. 18, f. 2; stolons 0, leaves oblong ovate or obovate toothed or crenate petiole very stout, cauline obtuse, spike elongate, bracts obovate or elliptic equalling or longer or shorter than the flowers. *Maximovicz in Bull. Imp. Acad. St. Petersb.* xxvii. (1881) 523, *excl. syn. L. decumbens.* Gymnandra Stelleri, *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA, alt. 11–15,000 ft., *Royle,* &c.—DISTRIB. Mts. of Central and N. Asia, and Arctic Asia and America.

Rootstock stout, with thick fleshy root-fibres. *Leaves* fleshy, radical 2–3 in., variable in breadth and toothing, narrowed into the very stout petiole; cauline ½ to 1½ in., ½-amplexicaul, often quite entire. *Flowering stems* several, 3–10 in. high, decumbent below, stout, leafy above. *Spike* 2–5 in.; bracts ⅓–½ in. *Calyx* nearly as long as the corolla-tube or shorter; lobes minutely fimbriate. *Corolla-tube* rather slender, tips very variable.

VAR. *cashmeriana*; radical leaves elliptic or oblong obtuse, bracts ovate toothed rather longer than the calyx, corolla deep blue much longer than the calyx, lower lip 2-cleft, or 3-cleft with the mid-lobe narrowest, filaments from half as long to as

long as the upper lip adnate below to its margins, style far exserted, stigma minute. Gymnandra cashmeriana, *Royle in Benth. Scroph. Ind.* 47, and *Ill. Himal. Pl.* 291, t. 73, f. 3; *Chois. in DC. Prodr.* xii. 25.—Western Himalaya, from Chumba to Kashmir, alt. 11–15,000 ft.

VAR. *kunawurensis*; radical leaves ovate or oblong-lanceolate, obtuse crenate-toothed, cauline sessile ovate subacute, bracts broadly ovate rather longer than the calyx, corolla purplish tube about equalling the calyx, lower lip usually 3-cleft, anthers subsessile, style shortly exserted 2-fid, fruit ovoid rugose. Gymnandra kunawurensis, *Royle & Chois. ll. cc.*—Western Himalaya; Kunawur, alt. 12–15,000 ft.; Rajhoti, N. of Kumaon, alt. 15,000 ft., *Strachey & Winterbottom.*—A stouter plant than Var. *cashmeriana.*

VAR. *sikkimensis*; habit of Var. *kunawurensis,* but flowers larger, corolla-lobes longer, lower lip cleft into 2 narrow lobes.—Sikkim Himalaya, alt. 16–17,000 ft., *J. D. H.*

I follow Maximovicz in referring all the Himalayan plants to *L. glauca,* except *L. decumbens* (the calyx of which is widely different, as are the habit and bracts). That author further refers *Gymnandra borealis, Pallasii,* and *Stelleri* to the same species, and I suppose with good reason. The two principal Himalayan forms, *kunawurensis* and *cashmeriana,* are however readily distinguishable, if I mistake not, by size, colour of flower, length of filaments, and stigma; and possibly by fruit, if, as I suspect (judging from unripe ones), that of *cashmeriana* is much the smaller, narrower, and smoother.

5. **L. spectabilis,** *Kurz in Journ. As. Soc.* xxxix. 2, 80 (*Gymnandra*); tall, very robust, stem leafy, cauline leaves sessile orbicular-obovate cuspidate quite entire, spike long, bracts ovate acute toothed rather longer than the calyx, anthers subsessile, style included, stigma capitate.

SIKKIM HIMALAYA; Phalloot, alt. 13,000 ft., *Kurz.*

Rootstock and radical leaves not seen. *Stem* 18 in., ½ in. diam., tapering downwards, naked below the middle. *Leaves* 2–3 in. long, ½-amplexicaul, decumbent; nerves very slender, nearly parallel to the margin, finely reticulate. *Spike* 4 in.; bracts ½ in. *Calyx-teeth* fimbriate. *Corolla-tube* equalling the calyx; upper lip short, lower of 2 long linear lobes.—Probably a very large state of *L. glauca* var. *sikkimensis*; I have seen but one specimen, without root-leaves.

ORDER CXI. **VERBENACEÆ.** (By C. B. Clarke.)

Herbs, shrubs, or trees. *Leaves* opposite or whorled, apparently scattered in *Geunsia,* simple or digitate (in *Peronema* pinnate); stipules 0. *Inflorescence* cymose, racemose or spicate; cymes often compound or panicled; bracts various. *Calyx* gamosepalous, persistent, 5–4- (rarely 6–8-) toothed. *Corolla* gamopetalous; tube often cylindric, limb 2-lipped or subequal 5- (rarely many-) lobed. *Stamens* 4, didynamous, rarely 2, 5–6. *Ovary* superior, 2-carpellary (except in *Geunsia*), 2–4-celled, or sub-1-celled, 4-ovuled (in *Phryma* 1-celled 1-ovuled), entire or 4-lobed; style terminal; ovules variously attached. *Fruit* a drupe or almost capsular, 4–2–1-celled (with many pyrenes in *Geunsia*), cells 1-seeded. *Seeds* erect or pendulous, albumen 0 (in the Indian genera); radicle inferior (except in *Phryma*).—Species 700, chiefly tropical.

Duranta, a large American bush, is much cultivated in India; it differs from all the Indian genera in its 8-celled ovary, drupe with 4 2-seeded pyrenes.

Tribe 1. PHRYMEÆ. *Ovary* 1-celled, 1-ovuled.

Herb. Spike slender, interrupted . . . . 1. PHRYMA.

Tribe 2. VERBENEÆ. *Inflorescence* spicate, centripetal.

* *Pyrenes of the fruit* 2–1, 1-*seeded.*

Shrubs. Calyx small. Fruit a drupe . . . . 2. LANTANA.
Small shrubs. Calyx small. Fruit capsular . . . . 3. LIPPIA.
Small shrubs. Calyx narrowly cylindric, 5-ribbed. Stamens 4 4. BOUCHEA.
Herb. Calyx narrowly cylindric, 5-ribbed. Stamens 4 . . 5. STACHYTARPHETA.

** *Pyrenes of the fruit* 2, *2-seeded.*

Herb. Calyx accrescent, enclosing the fruit . . . . . . 6. PRIVA.

*** *Pyrenes of the fruit* 4, *1-seeded.*

Herb. Calyx tubular, not accrescent . . . . 7. VERBENA.

Tribe 3. VITICEÆ. *Inflorescence* cymose, centrifugal; cymes panicled. *Drupe* with 4 (in *Geunsia* many) pyrenes.—Trees or shrubs.

* *Corolla regular, stamens isomerous, equal.* (Leaves entire.)

Flowers 5-merous. Leaves scattered. Drupe with 5–2 pyrenes 8. GEUNSIA.
Flowers 4-merous. Drupe with 4 pyrenes . . . . 9. CALLICARPA.
Flowers 4–6-merous. Drupe with 1 4-celled pyrene, included in the accrescent calyx . . . . 10. TECTONA.

** *Corolla 2-lipped, stamens didynamous.*

† *Drupe with* 1 *pyrene.*

Leaves entire or toothed. Flowers small . . . . 11. PREMNA.
Leaves entire or toothed. Corolla 1 inch . . . . 12. GMELINA.
Leaves digitate (in 1 species unifoliolate) . . . . 13. VITEX.

†† *Drupe with* 4 *pyrenes.* (Leaves simple.)

Calyx in flower campanulate . . . . 14. CLERODENDRON.
Calyx in flower large, patelliform . . . . 15. HOLMSKIOLDIA.

Tribe 4. CARYOPTERIDEÆ. *Inflorescence* cymose, centrifugal; cymes panicled. *Fruit* dividing into 4 pyrenes.—Trees or shrubs.

Leaves simple. Cymes axillary dense or thyrsoid . . . 16. CARYOPTERIS.
Leaves entire. Cymes in a dense corymbose panicle . . . 17. GLOSSOCARYA.
Leaves entire. Panicle pyramidal, lax . . . . 18. HYMENOPYRAMIS.
Leaves large, impari-pinnate . . . . 19. PERONEMA.

Tribe 5. SYMPHOREMEÆ. *Cymes* 3–9-flowered, capitate; bracts of the flower-head 6 or 3–4, usually large, involucriform. *Fruit* nearly dry, small. —Large climbers.

Bracts 6. Corolla 6–16-merous. Anthers long exsert . . 20. SYMPHOREMA.
Bracts 6. Corolla 5–6-merous. Anthers included or shortly exsert . . . . 21. SPHENODESMA.
Bracts 3–4. Corolla 2-lipped . . . . 22. CONGEA.

Tribe 6. AVICENNIEÆ. *Cymes* densely capitate. *Calyx* 5-partite; segments concave, much imbricate. *Fruit* capsular, somewhat fleshy, dehiscent.
Shrubs. Leaves entire. Flowers small . . . . 23. AVICENNIA.

I. **PHRYMA,** *Linn.*

An erect herb. *Leaves* petioled, membranous, toothed. *Spikes* long, slender; bracts linear, small; bracteoles minute. *Calyx* tubular; teeth 3, linear, hooked. *Corolla* small, tubular, 2-lipped; lower lip larger, of 3

rounded patent lobes. *Stamens* 4, didynamous; anthers round. *Ovary* oblong, oblique; ovule 1, erect, attached on one side near the base; style linear; stigma shortly unequally 2-lobed. *Utricle* membranous, enclosed in the reflexed calyx; radicle superior, cotyledons convolute.

P. leptostachya, *Linn.*; *Schauer in DC. Prodr.* xi. 520; leaves ovate or ovate-lanceolate thinly pubescent, peduncles terminal and from the upper axils. *Gaertn. Fruct.* i. 363, t. 75, fig. 10; *Lamk. Ill.* t. 516; *Wall. Cat.* 2088; *Schnizl. Ic. Fam. Nat.* t. 150 a; *Walp. Rep.* iv. 36.

W. HIMALAYA, alt. 3–7000 ft.; from Kashmir to Nepal frequent, *Wallich, Royle,* &c. KHASIA MTS., alt. 4–6000 ft.; *H. f. & T.*, &c.—DISTRIB. Amurland and Japan, Temp. N. America.

Height 1–2 ft. *Leaves* 2–4 in.; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. *Spikes* 6–15 in.; flowers alternate. *Calyx-tube* $\frac{1}{4}$ in.; nerves 15, in 5 groups of 3; teeth $\frac{1}{10}$ in. with purplish hooks. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., pink or pale purple. *Calyx* in fruit deflexed and appressed to the rachis. *Utricle* $\frac{1}{5}$ in., oblong.

II. **LANTANA,** *Linn.*

Rambling shrubs, pubescent or scabrous; branches tetragonous, sometimes prickly. *Leaves* simple, petioled, crenate, often rugose. *Spikes* peduncled, capitate, ovoid or cylindric; bracts conspicuous, exceeding the calyx; bracteoles 0. *Calyx* small, membranous, truncate or sinuate-toothed. *Corolla-tube* slender, cylindric; lobes 4–5, spreading. *Stamens* 4, didynamous, included; anthers broadly oblong. *Ovary* 2-celled, 2-ovuled; style short, stigma oblique subcapitate. *Drupe* fleshy or nearly dry, containing 2 bony, 1-celled pyrenes. *Seed* without albumen; radicle inferior.—Species 40, tropical or subtropical, mostly American.

L. Camara, Linn. (Schauer in DC. Prodr. xi. 598; L. aculeata, *Linn.*; *Roxb. Hort. Beng.* 46. ? *L. mixta,* Linn. in Thwaites Enum. 242), an American plant, has run wild in India, especially in the W. Deccan Peninsula and Ceylon. It is readily recognized by the numerous recurved prickles on the branches.

1. **L. indica,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 89; leaves ovate or lanceolate softly hairy above, bracts ovate or elliptic acuminate softly loosely hairy. *Wall. Cat.* 1823, *type sheet* a, b; *Wight Ill.* t. 173 b, fig. 3, and *Ic.* t. 1464. L. latifolia, *Tausch in Flora* 1836, 391. L. dubia, *Wall. Cat.* 1821, 2 and C not 1; *Royle Ill.* 300, t. 73, fig. 2. L. collina, *Decne. in Jacquem. Voy. Bot.* 136, t. 141. L. alba, *Schauer in DC. Prodr.* xi. 606; *Dalz. & Gibs. Bomb. Fl.* 198; *Brandis For. Fl.* 369; *Kurz For. Fl.* ii. 253; *Boiss. Fl. Orient.* iv. 532, *not of Miller, Dcne., nor Link.*

Throughout INDIA and CEYLON in the warmer parts, common; on the river-banks of Bengal one of the commonest weeds.—DISTRIB. Beloochistan, Trop. Africa.

A shrub, 3–8 ft. high; branches long, rambling, appressedly scabrid-pubescent, or towards the tips patently densely fulvous-hairy. *Leaves* 1–3 in., opposite or ternate, tip not rounded, rugose, above softly hairy, beneath more densely often woolly sometimes white-woolly; petiole $\frac{1}{4}$ in. *Peduncles* numerous, axillary 1–3 in., usually opposite; heads ovoid, usually $\frac{1}{2}$–$\frac{3}{4}$ in., sometimes in fruit 2–3 in. long, cylindric; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., upper smaller, ovate or even cordate in the typical form, but varying to lanceolate. *Calyx* less than $\frac{1}{16}$ in., hairy. *Corolla* $\frac{1}{3}$ in., hairy, mouth $\frac{1}{4}$ in. diam., usually pink, the tube yellowish, varying from dull purple to white. *Drupe* $\frac{1}{8}$–$\frac{1}{5}$ in. diam., purple.

VAR. *albiflora,* Wight ms.; leaves small obtuse, outer bracts ovate minutely closely pubescent. L. Wightiana, *Wall. Cat.* 2655. Lantana n. 1, *Herb. Ind. Or. H. f. & T.*—S. Madras, in or near the hills; Pulney Mts. and Courtallum, *Wight,* &c.—*Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. *Corolla* $\frac{1}{6}$ in. diam. *Drupe* $\frac{1}{12}$ in. diam.

2. **L. crenulata,** *Otto & Dietr. in Berlin Gartenzeit.* ix. 363; leaves ovate-lanceolate very scabrous above, bracts narrowly oblong or subspathulate scabrid-pubescent. *Schauer in DC. Prodr.* xii. 598. L. indica *var.* salvifolia only, *Wall. Cat.* 1823. L. annua, *Hort. Calc., not Linn.*

N.W. INDIA, *Royle, Falconer*; Moradabad (cultivated), *Thomson.* MADRAS; Vola Charnee, *Thomson.*

Resembling *L. indica. Leaves* finely crenated, very scabrid above. Outermost *bracts* ¼ by $\frac{1}{16}$ in. *Corolla* from yellow to orange.—This plant may not be wild in India, but it is not known where it is so.

3. **L. trifolia,** *Linn.*; *Bot. Mag.* t. 1449; branches patently hairy, leaves often ternate ovate-lanceolate hairy somewhat scabrous above, outer bracts lanceolate much acuminate hairs not closely appressed. *Schauer in DC. Prodr.* xi. 607. L. indica, *Wall. Cat.* 1823, sheet B, letters a, d. L. dubia, *Wall. Cat.* 1821, n. 1 only.

Throughout INDIA, naturalized from the N.W., *Royle,* to CEYLON, *Wight.* BENGAL; Dacca, Burisal, Chittagong, *J. D. H.*, &c.—DISTRIB. Trop. America.

Resembling *L. indica*; so much so that ternate-leaved examples of *L. indica* are generally marked *L. trifolia.* Perhaps only a denizen in British India.

DOUBTFUL SPECIES.

L. SCABRA, *Wall. Cat.* 1822, is not to be found in Wallich's Herbarium.

III. LIPPIA, *Linn.*

Fruit dry, separating into 2 1-seeded pyrenes. Otherwise as *Lantana.*—Species 90, mostly American.

The genus *Lippia* can hardly be distinguished from *Lantana,* but the present species is easily recognized by its creeping habit and alternate peduncles. *Rheede Hort. Mal.* x. t. 93, sometimes quoted for this plant, has large bracts to the heads, nor does it represent the creeping habit. Roxburgh, by some slip, has omitted the genus *Verbena* in Fl. Ind., though he has it in Hort. Beng.

1. **L. nodiflora,** *Rich. in Michx. Fl. Bor. Amer.* ii. 15; annual, creeping, minutely strigose, leaves cuneate-spathulate serrate, peduncles axillary rarely opposite, bracts obovate shortly acuminate as long as the corolla-tube. *Schauer in DC. Prodr.* xi. 585; *Wight Ill.* t. 173 b, fig. 2, and *Ic.* t. 1463; *Dalz. & Gibs. Bomb. Fl.* 198; *Boiss. Fl. Orient.* iv. 532. Verbena nodiflora, *Linn.*; *Burm. Fl. Ind.* 12, t. 6, fig. 1; *Roxb. Hort. Beng.* 4; *Sibth. Fl. Gr.* t. 553. V. capitata, *Forsk. Fl. Æg.-Arab.* 10. Blairia nodiflora, *Gaertn. Fruct.* i. 266, t. 56. Zapania nodiflora, *Lamk. Ill.* t. 17; *Wall. Cat.* 1824. L. repens, *Bert. Rar. Ital. Pl.* iii. 27. Lantana sarmentosa & repens, *Spreng. Syst.* ii. 752. Phyla chinensis, *Lour. Fl. Cochinch.* 66.

Throughout INDIA and CEYLON, in wet grass; abundant.—DISTRIB. All tropical and warm-temperate regions.

Extending 6–30 in., much branched, often rooting from the nodes. *Leaves* subsessile, 1 by ⅛ in., sharply toothed, base attenuate entire. *Peduncle* 1–3 in., with very rarely another from the opposite axil; heads ½ by ¼ in., ovoid or cylindric; bracts $\frac{1}{16}$ in., ovate, shortly acute, outermost not much larger than the others. *Calyx* minute, 2-fid, hairy. *Corolla* $\frac{1}{20}$–⅛ in., tube slender, mouth 2-lipped, lower lip rather longer, pinkish-purple to white. *Fruit* hardly $\frac{1}{12}$ in. diam., nearly dry.

2. **L. geminata,** *H. B. K. Nov. Gen. & Sp. Pl.* ii. 266; shrubby, leaves ovate-oblong crenate softly strigose, peduncles mostly opposite, bracts ovate acuminate softly hairy. *Schauer in DC. Prodr.* xi. 582, *with syn.*

Lantana sp. n. 5, ***Herb. Ind. Or. H. f. & T.*** Lantana canescens, ***Hort. Calc., not Linn.***

BENGAL, frequent; below Dacca, *J. D. H.*, &c.—DISTRIB. Trop. America, a widely dispersed weed.

So closely resembling *Lantana indica* that without fruit it is difficult to distinguish. *Leaves* and *peduncles* opposite or ternate. *Peduncles* rarely exceeding ½–1 in.; outer bracts rarely exceeding ⅛ in. *Fruit* 1/16–1/12 in. diam.

IV. BOUCHEA, *Cham.*

Herbs or undershrubs. *Leaves* petioled, ovate or oblong, toothed. *Spikes* terminal, linear, elongate; bracts much shorter than the calyx. *Calyx* narrowly cylindric, strongly 5-ribbed, very shortly 5-toothed, in fruit slightly enlarged, split to the base on the outer side (in the Indian species). *Corolla-tube* very narrowly cylindric; limb patent, 5-lobed. *Stamens* included, didynamous; anthers ovate, cells 2 parallel. *Ovary* 2-celled, cells 1–2-ovuled; style short, linear; stigma 1-sided, toothed. *Fruit* dry, included in the calyx, of 2 elongate-oblong 1-seeded pyrenes.—Species 16, in the warmer parts of America and Africa, 2 extending to India.

1. **B. marrubifolia,** *Schauer in DC. Prodr.* xi. 558; hoary-pubescent, leaves ovate, corolla-tube ⅓–½ in., mouth scarcely ⅙ in. diam. *Wight Ic.* t. 1461.

SCINDE; *Stocks, Dalzell.*—DISTRIB. Arabia, Egypt, Abyssinia, Central Africa.

Woody, much branched. *Leaves* 1 by ½ in., coarsely toothed, hoary-pubescent on both surfaces; petiole ½ in. *Spikes* 2–5 in., nearly continuous; flowers alternate; bracts ⅛ in., lanceolate. *Calyx* ¼ in., subtruncate, inflated in fruit. *Corolla-tube* scarcely 1/30 in. diam. *Pyrenes* ⅛–⅙ in., linear-oblong, black.

2. **B. hyderabadensis,** *Walp. Rep.* iv. 12; leaves ovate-oblong glabrescent, corolla-tube ½–⅔ in. mouth ½ in. diam. *Wight Ill.* t. 173 b, fig. 1, and *Ic.* t. 1462; *Schauer in DC. Prodr.* xi. 559; *Thwaites Enum.* 241. Verbena hyderabadensis, *Heyne in Herb. Rottler*; *Wall. Cat.* 6318.

DECCAN PENINSULA and CEYLON; *Rottler, Wight, Thwaites*, &c.

Branches woody, elongate little divided upwards, nearly glabrous. *Leaves* 3–4 by 1½ in., serrate, nerves beneath minutely pubescent; petiole ⅔ in. *Spikes* 2–6 in., dense; bracts ⅙ in., lanceolate. *Calyx* ½ in., nearly glabrous; teeth 1/16 in., linear. *Corolla-tube* funnel-shaped upwards; limb pink-purple. *Pyrenes* exceeding ¼ in., linear-oblong, slightly wider upwards, margined, straw-coloured, smooth on the inner face (the thickened inner layer of tissue becoming white and flaking off).

V. STACHYTARPHETA, *Vahl.*

Herbs or shrubs. *Leaves* toothed. *Spikes* terminal, long, slender (in the Indian species); bracts long or short; bracteoles 0. *Calyx* narrowly cylindric, shortly 4–5-toothed. *Corolla-tube* cylindric; limb oblique, patent, 5-lobed. *Stamens* 2 fertile, included; anther-cells ovate, vertically divaricate. *Ovary* and *fruit* nearly as of *Bouchea*.—Species 40, in warm America.

S. indica, *Vahl Enum.* i. 206; leaves elliptic serrate nearly glabrous, flowers ultimately somewhat sunk in the thickened rachis, bracts lanceolate as long as the oblique 4-toothed calyx. *Thwaites Enum.* 241. S. jamaicensis, *Vahl l. c.*; *Bot. Mag.* t. 1860. S. urticifolia, *Dalz. & Gibs. Bomb. Fl. Suppl.* 68. Stachytarpha indica & jamaicensis, *Schauer in DC. Prodr.* xi.

564. S. villosa, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 197. Verbena indica, *Linn.*; *Wall. Cat.* 2656. V. jamaicensis, *Linn.*; *Roxb. Hort. Beng.* 4.

TROPICAL INDIA from the Punjab and Silhet to Travancore and Singapore; CEYLON, plentiful.—DISTRIB. Trop. Asia and America.

A herb, 1–2 ft., nearly glabrous; branches quadrangular. *Leaves* 1–4 in., subobtuse, base decurrent. *Spikes* 3–12 in., nearly continuous. *Calyx* $\frac{1}{3}$ in., 4-nerved. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., deep-blue. *Pyrenes* $\frac{1}{8}$ in.—Probably naturalized in Asia; the examples from extra-tropical India are almost surely escapes.

VI. PRIVA, *Adans.*

Erect herbs. *Leaves* toothed. *Spikes* slender; bracts small, narrow. *Calyx* tubular, shortly 5-toothed; in fruit enlarged, ovoid with a very small mouth. *Corolla-tube* narrowly cylindric; limb oblique, patent, 5-lobed. *Stamens* 4, didynamous, included; anther-cells parallel. *Ovary* 2-celled, cells 2-ovuled; style linear, stigma on one side. *Fruit* dry, separating into 2 2-seeded pyrenes.—Species 9, chiefly tropical American.

P. leptostachya, *Juss. in Ann. Mus.* vii. 70; leaves petioled ovate, spikes long interrupted, calyx with hooked hairs, fruit obcordate muricate. *Walp. Rep.* iv. 35; *Schauer in DC. Prodr.* xi. 533; *Dalz. & Gibs. Bomb. Fl.* 198. P. abyssinica & P. Forskalii, *Meyer*; *Jaub. & Spach. Ill. Pl. Or.* tt. 453–455. Tortula aspera, *Roxb.*; *Willd. Sp. Pl.* iii. 359; *Roth Nov. Sp.* 299. Streptium asperum, *Roxb. Cor. Pl.* ii. 25, t. 146, and *Fl. Ind.* iii. 90; *Wall. Cat.* 2657; *Wight in Hook. Journ. Bot.* i. 230, t. 130.

DECCAN PENINSULA; *Roxburgh, Wight,* &c.—DISTRIB. Africa.

Stem 6–18 in. *Leaves* $1\frac{3}{4}$ by $\frac{3}{4}$ in., crenate-serrate, thinly somewhat softly hairy in all the examples, but (ex Roxburgh) covered with stiff hooked hairs; petiole 1 in. *Spikes* 6–12 in., lower flowers distant. *Calyx* $\frac{1}{8}$ by $\frac{1}{12}$ in. in flower; in fruit $\frac{1}{4}$ in. broad, hispid with 1-celled white hooked hairs. *Corolla* $\frac{1}{3}$ in., white. *Pyrenes* obcordate, with 2 rows of hooked small spines on the back, each presenting a large cavity towards the axis.

VII. VERBENA, *Linn.*

Pubescent herbs or undershrubs. *Leaves* opposite or ternately whorled, toothed or pinnatifid. *Spikes* terminal, simple or corymbose; bracts and flowers small. *Calyx* tubular, shortly 5-toothed. *Corolla* tubular; limb more or less oblique, sub-2-lipped, 5-lobed. *Stamens* 4, didynamous, included; anthers ovate, 2-celled, cells sub-parallel. *Ovary* 1-celled, more or less 4-lobed (sometimes even at flower-time 4-celled), 4-ovuled; style short, obscurely 2-lobed; ovules attached laterally near the base of the cell. *Fruit* included in the calyx; pyrenes 4 or fewer, oblong.—Species 80; all except 2 American.

V. bonariensis, Linn. (Roxb. Hort. Beng. 4; Schauer in DC. Prodr. xi. 541), a native of Brazil, is naturalized in the Himalaya, the Nilgherries, and elsewhere in the Old World. It has sessile, oblong, sharply serrate leaves, and short spikes in dense corymbs or heads.

V. officinalis, *Linn.*; *Schauer in DC. Prodr.* xi. 547; herbaceous, leaves oblong or ovate pinnatifid or coarsely toothed, spikes panicled slender ultimately interrupted below. *Lour. Fl. Cochinch.* 27; *Roxb. Hort. Beng.* 4; *Wall. Cat.* 1825; *Hayne Pl. Off.* 5, t. 42; *Boiss. Fl. Orient.* iv. 534.

V. spuria, *Linn. Sp. Pl.* 29. V. sororia, *Don Prodr.* 104; *Sweet Brit. Fl. Gard.* iii. t. 202.

HIMALAYA, alt. 1–6000 ft., from Kashmir to Bhotan, frequent. BENGAL PLAIN to the Sunderbunds, frequent.—DISTRIB. Temperate and subtropical regions.

Stems 1–2 ft., decumbent, then erect, quadrangular, puberulous. *Leaves* 2–4 in., variously lobed, base narrowed, lower petioled, more or less pubescent, usually hoary on the nerves beneath. *Spikes* at first dense, in fruit 3–10 in. *Calyx* $\frac{1}{18}$–$\frac{1}{12}$ in., apparently of 4 oblong and 1 linear segments united into a tube by their scarious margins; teeth most minute. *Corolla* $\frac{1}{4}$ in., blue; lobes subquadrate, throat hairy. *Pyrenes* $\frac{1}{20}$–$\frac{1}{18}$ in., oblong, 3-ribbed, smooth dorsally, their inner faces with minute white flaking cells similar to those of *Bouchea hyderabadensis*.—T. Thomson collected at Kussoor, and Clarke at Chumba, a monstrous form with proliferous spikes, forming densely branched panicles, the lower flowers all pedicelled, variously altered and infertile.

VIII. **GEUNSIA,** *Blume.*

Trees or large shrubs, stellately tomentose. *Leaves* opposite, every alternate pair usually widely separated so that there appear to be 2 alternate leaves on each internode, petioled, nearly entire. *Cymes* peduncled, axillary, many-flowered; bracts linear, small. *Calyx* campanulate, shortly 5–6-toothed. *Corolla* tubular; limb equally 5–6-toothed. *Stamens* 5; anthers exserted; cells oblong, parallel. *Ovary* imperfectly 5–3-celled; cells 2-ovuled; style exserted, stigma dilated 5–3-lobed. *Drupe* small; pyrenes 5–2, 1-seeded.—Species 4, Malayan.

G. farinosa, *Blume Bijd.* 819; leaves broadly oblong acuminate minutely toothed stellate-tomentose beneath, flowers 5-merous. Callicarpa pentandra, *Roxb. Fl. Ind.* i. 395; *Wall. Cat.* 1835; *Schauer in DC. Prodr.* xi. 646. C. acuminatissima, *Teijs. & Binn. in Batav. Nat. Tidschr.* xxv. 316.

SINGAPORE; *Wallich*.—DISTRIB. Malaya.

A lofty tree. *Leaves* 8 by 3 in., base cuneate or rounded, mature glabrate above; petiole 1 in. *Peduncles* 1–2 in.; cymes 2–3 in. diam., densely stellate-tomentose. *Corolla* $\frac{1}{4}$ in., lilac, occasionally 6-merous, fide Teijs. & Binnend. *Drupe* $\frac{1}{6}$ in. diam.—Resembling the arborescent *Callicarpas*; readily distinguished by the mixture of both opposite and alternate leaves, and by the 5-merous flowers. *C. hexandra,* Teijs. & Binn. *l. c.*, is *C. Cumingiana,* Schauer *l. c.* 644, or very nearly so, and perhaps neither is distinct from *Geunsia farinosa*; but Cuming's n. 1773, reduced to *G. farinosa* by Schauer, is probably, as stated in Gen. Pl. 2, p. 1150, a good species.

IX. **CALLICARPA,** *Linn.*

Shrubs or trees; innovations stellately hairy. *Leaves* opposite, rarely ternately, whorled toothed or subentire (in *C. lobata* lobed). *Cymes* axillary, shorter than the leaves; bracts linear, inconspicuous. *Calyx* very small (less than $\frac{1}{8}$ in.), campanulate, limb minutely 4-lobed, unaltered in fruit. *Corolla* small (about $\frac{1}{4}$ in.), tubular, subsymmetric, purple or red; lobes 4, subquadrate-oblong, patent. *Stamens* 4; anthers exserted, 2-celled, glandular. *Ovary* imperfectly 2-celled, cells 2-ovuled; style linear, stigma dilated obscurely bifid. *Drupe* small (less than $\frac{1}{6}$ in.), globose; pyrenes 4, or by suppression fewer, 1-seeded. *Seeds* shortly oblong, exalbuminous.—Species 30, mostly E. Asian, Malayan and N. Australian; a few Polynesian, Columbian and W. Indian.

1. **C. lobata,** *Clarke*; leaves very long-petioled ample cordate-ovate

3-5-lobed mature nearly glabrate, cymes dense stellately tomentose shorter than the petiole. Callicarpa sp. n. 27, *Herb. Ind. Or. H. f. & T.*

ALPINE N.E. NEPAL; Yalloong, alt. 10–11,000 ft., *J. D. H.*

A deciduous tree, 16 ft.; branches thick, stellately tomentose, crowded with leaves at the tips. *Leaves* 12–15 in. diam., palmately 5–7-nerved, membranous; lobes ovate, acuminate, denticulate, stellately hairy on both surfaces when young, mature with some stellate hair along the nerves beneath; hairs stalked, often with 2 whorls of secondary hairs; glands scattered; petiole 4–8 in. *Peduncles* 2½ in., often 2 superposed in each opposite axil; leaves fallen from the flower-bearing axils in the specimens; cymes 2–4 in. diam., resembling those of *C. arborea*. *Calyx* $\frac{1}{30}$ in., funnel-shaped, subtruncate, stellately hairy. *Corolla* ⅛ in., tubular, nearly glabrous in flower; lobes 4, short, ovate. *Stamens* 4. *Fruit* not seen.

2. **C. arborea,** *Roxb. Hort. Beng.* 10, and *Fl. Ind.* i. 390; arboreous, leaves ovate to narrowly oblong acute entire or nearly so closely tomentose beneath, peduncles as long as the petioles closely tomentose, fruit purple ultimately black. *Wall. Cat.* 1826, *chiefly*; *Schauer in DC. Prodr.* xi. 641; *Brand. For. Fl.* 368; *Kurz For. Fl.* ii. 274. C. tectonaefolia, *Wall. Cat.* 1827. C. villosa, *Roxb. Hort. Beng. l. c.* C. farinosa, *Roxb. mss.*

N. INDIA, in the lower hills, alt. 0–4000 ft., from Kumaon to Assam, common in the Sikkim Terai; Rajmahl. E. PENINSULA, from the Khasia Terai and Muneypoor to Singapore.—DISTRIB. Ava, Sumatra.

A tree, often 40 ft., with a thick trunk and round head. *Leaves* usually 6–8 in., base rhomboid, leathery, mature glabrate above; stellate hairs beneath very close, sessile, persistent, covering the numerous glands; petiole 1–2 in. *Calyx* $\frac{1}{40}$ in., subtruncate, stellately pubescent. *Corolla* ⅛ in., puberulous, lavender or pale purple. *Berry* $\frac{1}{10}$ in. diam.—Generally to be recognized by the entire leaves with very close persistent hard tomentum beneath; but the leaves are toothed in Khasian examples collected at Nunklow, and the tomentum is spreading and very woolly on some from the Malay Peninsula. Leaves usually cuneate at base, but rounded in the form *C. villosa*, Roxb. *C. villosa*, Vahl, is a doubtfully Indian plant.

3. **C. vestita,** *Wall. ms.*; arboreous, leaves ovate acute subentire silkily white-tomentose beneath, peduncles as long as the petioles stellately tomentose. C. lanata, *Gamble Darjeeling List* 60, *not of Linn.* C. arborea, *Wall. Cat.* 1826, *partly*.—Callicarpa sp. n. 3 & 4, *Herb. Ind. Or. H. f. & T.*

NEPAL; Noakote, *Wallich*. SIKKIM, alt. 1–4000 ft., in the outer valleys and Terai, frequent; *Herb. Griffith, J. D. H.* (Kew Distrib. n. 6042), &c.

A tree, 30 ft.; resembling *C. arborea*. *Leaves* 4–10 in., base rounded or cuneate; tomentum beneath of stellate hairs having the secondary hairs fine, long and white. *Inflorescence* stellately white or tawny tomentose. *Calyx* at flower-time nearly glabrous.—Otherwise resembling *C. arborea*.

4. **C. lanata,** *Linn. Mant.* 331, *not of Schauer, nor of Griff.*; arboreous, leaves ovate or ovate-lanceolate subentire stellately tomentose beneath, peduncles shorter than the petioles furred. *Vahl Symb.* iii. 13; *Roxb. Fl. Ind.* i. 391; *Ham. in Trans. Linn.* xvii. 251; *Wall. Cat.* 1831; *Grah. Cat. Pl. Bomb.* 156; *Brand. For. Fl.* 368; *Bedd. For. Man.* 173, and *Anal. Pl.* 21, fig. 6. C. Tomex, *Poir. Suppl.* ii. 32. C. cana, *Dalz. & Gibs. Bomb. Fl.* 200, *not of Linn.* C. Wallichiana, *Walp. Rep.* iv. 125; *Schauer in DC. Prodr.* xi. 641; *Wight Ill.* t. 173 b, fig. 5, and *Ic.* t. 1480. C. arborea, *Miq. in Pl. Hohenack.* n. 152, *not of Roxb.* Tomex tomentosa, *Linn. Fl. Zeyl.* 24. Cornutia corymbosa, *Lamk. Dict.* i. 54.

Throughout the DECCAN PENINSULA and CEYLON, common; ascending to 4000 ft.

A tree, 20–40 ft.; tips of branches cinnamoneous, shaggy and woolly. *Leaves*

4–8 in., base cuneate rounded or subcordate; tomentum beneath of stalked hairs often with several whorls of secondary hairs, usually dense, in a few examples from Cochin thin but of similar structure. *Calyx* at flower-time stellately hairy.—Otherwise much resembling *C. arborea* and *Hookeri*. The leaves vary from subcordate orbicular cuspidate to oblong and acuminate at both ends. The nature of the hairs appears absolutely constant. C. lanata, *Griff. Notul.* iv. 173, and *Ic. Pl. Asiat.* t. 447 from Bhamo, has 5 stamens.

5. **C. macrophylla,** *Vahl Symb.* iii. 13, t. 53; shrubby, leaves ovate or ovate-lanceolate closely crenate densely persistently stellate-tomentose beneath, peduncles short, berry white. *Roxb. Fl. Ind.* i. 393; *Wall. Cat.* 1832; *Schauer in DC. Prodr.* xi. 644; *Benth. Fl. Hongk.* 270; *Brandis For. Fl.* 368; *Kurz For. Fl.* ii. 274. C. incana, *Roxb. l. c.* C. Roxburghii, *Wall. Cat.* 1833, *partly.* C. cana, *Gamble Darjeeling List* 60, and *Indian Timbers* 283, *not of Linn.*—Callicarpus sp., *Jones in As. Research.* iv. 233.

Throughout N. and E. INDIA, ascending to 6000 ft. in the W. Himalaya; from Kashmir to Assam and Pegu; abundant in Bengal Plain. ? DECCAN PENINSULA.

A shrub, 3–8 ft.; trunk hardly any, branches wand-like, usually shaggy as well as tomentose at the tips. *Leaves* 4–7 in., acuminate, base rounded or cuneate, mature glabrate above, tomentose with compound stellate hairs beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* usually shorter than the petioles; cymes 1–3 in. diam., globose. *Calyx* scarcely $\frac{1}{20}$ in. long, stellately hairy at flower-time, lobes small triangular or hardly any. *Anthers* small, ovate.—There is only one example of this from the Deccan, marked as communicated by W. Barclay from Malabar. From Wight and Beddome's silence it may be doubted if it is wild there. Rheede Hort. Mal. 4, t. 60, usually quoted as *C. macrophylla,* looks as like *C. lanata,* but may not be a *Callicarpa* at all. *Wall. Cat.* 1833 *type sheet* is the true C. Roxburghii (Schauer l. c. 640), a non-Indian plant. The typical *C. macrophylla,* Vahl, has ovate leaves, somewhat obtuse at base, thickly white-tomentose beneath. This is common in and near the hills. Roxburgh's *C. incana* is the less showy form, common in Bengal Plain (as he truly says), with the leaf-base often cuneate.

VAR. *Griffithii*; much branched, leaves smaller fuscous-woolly obscurely stellate beneath ultimately glabrate.—Bhotan; *Griffith* (Kew Distrib. n. 6041).—Differs a good deal in habit from *C. macrophylla,* but connected by E. Nepal specimens collected by Sir J. D. H.

VAR. *sinensis;* leaves oblong-lanceolate closely denticulate, peduncles longer than the petioles, anthers oblong larger.—Canara; *Gibson.* Calcutta; cult. Distrib. China.—Branches upwards dense with leaves. Teeth of the leaves with minute black glandular points. *Calyx* in flower stellately tomentose, soon nearly glabrate; teeth triangular, in fruit sometimes longer than the tube. Probably a cultivated plant: it seems as near to *C. Reevesii* as to *C. macrophylla.*

6. **C. Reevesii,** *Wall. Cat.* 1830; shrubby, leaves elliptic-lanceolate closely crenate mature glabrate above densely stellate-tomentose beneath, peduncles longer than the petioles, cymes somewhat lax stellately tomentose, calyx at flower-time nearly glabrous. *Schauer in DC. Prodr.* xi. 641; *Benth. Fl. Hongk.* 270. C. nudiflora, *Hook. et Arn. Bot. Beech. Voy.* p. 206, t. 46.

TENASSERIM (?); *Falconer.* SINGAPORE; *Murton.*—DISTRIB. S. China.

May be a cultivated plant; it is very near *C. macrophylla.* The leaves are very handsome, dark above, white tomentose beneath; the anthers are nearly as of *C. macrophylla* var. *sinensis.*

7. **C. cana,** *Linn. Mant.* 198; shrubby, leaves broadly elliptic shortly acuminate at both ends sharply crenate-serrate mature glabrate above densely stellate-tomentose beneath, peduncles very short, calyx in fruit stellate-tomentose. *Vahl Symb.* iii. 12; *Roxb. Fl. Ind.* i. 392; *Wall. Cat.*

1834, *type sheet*; *Blume Bijd.* 817; *Dcne. in Nouv. Ann. Mus.* iii. 401; *Schauer in DC. Prodr.* xi. 643; *Benth. Fl. Austral.* v. 56. C. tomentosa, *Lcmk. Dict.* i. 562. C. americana, *Lour. Fl. Cochinch.* 70, *not of Linn.* C. adenanthera, *Br. Prodr.* 513. C. Heynei, *Roth Nov. Sp.* 82; *Blume Bijd.* 819. C. bicolor, *Juss. in Ann. Mus.* vii. 77; *Schauer l. c.* 642. C. sumatrana, *Miq. Fl. Ind. Bat.* ii. 886. C. dentata, *Herb. Roxb., Wall. Cat.* 1834 *by admixture, not of Roth.*

PENANG; *Wallich.* MALACCA; *Griffith, Maingay.*—DISTRIB. Malaya and Philippine Islands, N. Australia.

Leaves 4½ by 2⅛ in., suddenly cuneate and narrowed into the petiole, often almost spathulate, mature shining above, usually very white beneath; petiole ¼–¾ in. *Peduncles* usually ⅛–¼ in.; cyme 1–2 in. diam., globose. *Fruit* deep-purple, finally black.—Widely cultivated for the strong contrast between the upper and lower surface of the leaves. The figure in Bot. Mag. (t. 2107) is doubted by Bentham l. c., and with reason.

8. **C. pedunculata,** *Br. Prodr.* 513; shrubby, leaves broadly elliptic acuminate base rounded closely serrulate mature puberulous above thinly stellate-flocculose beneath, peduncles often as long as the petiole. *Benth. Fl. Austral.* v. 57. C. cuspidata, *Roxb. Fl. Ind.* i. 394. C. dentata, *Roth Nov. Sp.* 81; *Blume Bijd.* 818; *Wall. Cat.* 6319. C. cana, *Wall. Cat.* 1834, n. 2. C. lanata, *Schauer in DC. Prodr.* xi. 644, *not of Linn., nor of Vahl.* C. tiliaefolia, *Teijsm. & Binnend. fide Kurz ms.*

PENANG; *Wallich.*—DISTRIB. Malaya, Trop. Australia.

Leaves 5 by 2¼ in., membranous, stellate tomentum somewhat deciduous; petiole ¼ in., stellate-woolly. *Cymes* 1–2 in. diam., globose, dense, stellately woolly; peduncles ¼–½ in. *Fruit* $\frac{1}{10}$ in. diam., dark purple.—Easily distinguished from *C. cana* by the nearly concolorous surfaces of the leaf.

9. **C. rubella,** *Lindl. Bot. Reg.* t. 883; arborescent, leaves very short-petioled cordate-oblong acuminate crenate-serrate mature softly pubescent above tomentose beneath, peduncles short, calyx in flower stellately tomentose. *Schauer in DC. Prodr.* xi. 645; *Benth. Fl. Hongk.* 271. C. sessilifolia, *Wall. Cat.* 1837; *Walp. Rep.* iv. 130. C. tenuiflora, *Champ. in Hook. Kew Journ.* v. 135.

SIKKIM, alt. 2000 ft.; *Clarke.* KHASIA and JAINTEA MTS., alt. 2–4000 ft., frequent; *Wallich, H. f. & T.*, &c.—DISTRIB. China.

An erect, single-stemmed shrub, 10–20 ft., with horizontal branches and complanate foliage. *Leaves* 5 by 1–1¼ in., parallel-sided or slightly obovate, closely covered with short simple hairs above, concolorous beneath; petiole $\frac{1}{10}$–¼ in. *Peduncles* ¼–½ in.; cymes 1–2 in. diam., stellately tomentose. *Calyx* not membranous, nor glabrate in fruit. *Corolla* pink. *Fruit* ⅛–⅙ in. diam., fine purple.—Lindley's figure represents correctly the Chinese form of this species having the leaves "crossing each other" subsessile, mature nearly glabrate above very thinly stellate-hairy beneath. The description of Schauer l. c. is taken from the Indian form, *C. sessilifolia*, Wall., which, however, has the petioles longer than the Chinese.

10. **P. psilocalyx,** *Clarke*; arborescent, leaves elliptic acuminate denticulate mature nearly glabrous, cymes small short-peduncled stellately villous, calyx membranous in flower glandular scarcely hairy.

KHASIA MTS., alt. 4–5000 ft.; *Wallich, J. D. H.*, &c.

A small tree; branchlets densely stellate-tomentose. *Leaves* 8 by 2¾ in., or 2½ by 1 in., base rounded or cuneate thinly membranous, mature with scattered stellate hairs on the midrib beneath, tertiary venation close prominent, glands minute scattered; petiole ⅛–¼ in. *Peduncles* mostly very short; cymes usually few-fld.; pedicels sometimes pink. *Calyx* $\frac{1}{24}$ in., minutely 4-toothed, greenish or pinkish,

minutely gland-dotted, with a few scattered hairs when young, whiteish or membranous in fruit. *Corolla* pink. *Fruit* scarcely $\frac{1}{12}$ in. diam.—C. longifolia, *Benth. Fl. Hongk.* 270 (*not of Lamk.*), in the glabrous calyx, inflorescence, and structure of leaves comes very near this; but in that the leaves are linear-lanceolate, and the fruit very much larger.

11. **C. longifolia,** *Lamk. Ill.* i. 563, and *Ill.* t. 69; shrubby, leaves petioled broadly lanceolate acuminate at both ends serrulate mature thinly stellate-hairy beneath, cymes short-peduncled dense, calyx stellately white-tomentose. *Bot. Reg.* t. 864; *Roxb. Fl. Ind.* i. 394; *Brand. For. Fl.* 369; *Kurz For. Fl.* 275; *Schauer in DC. Prodr.* xi. 645, *Var. β only*; *Benth. Fl. Austral.* v. 57, *not Fl. Hongk.* 270. C. Roxburghiana, *Roem. & Sch. Syst.* iii. *Mant.* 54. C. attenuata, *Wall. Cat.* 1835. C. cana, *Wall. Cat.* 1834, *partly*. C. dentata, *Wall. Cat.* 6319, *partly*.

MALAY PENINSULA; Penang, *Wallich, Roxburgh*; Malacca, *Griffith* (Kew Distrib. n. 6039), &c. NICOBARS; *Kurz*.—DISTRIB. W. Malaya to N. Australia.

Branchlets densely stellate-tomentose. *Leaves* 5 by 2 in., base much attenuate, mature nearly glabrous above, beneath so closely fulvous stellate-villous that few of the largeish glands can be seen; petiole $\frac{1}{2}$ in. *Cyme* in flower $1\frac{1}{2}$ in. diam., densely stellate-tomentose; peduncle $\frac{1}{3}$ in. *Calyx* $\frac{1}{16}$–$\frac{1}{12}$ in. *Corolla* purple or pink, or sometimes white (fide Benth.). *Berry* $\frac{1}{10}$ in. diam., white.—The details of this description are from the Penang plant. *C. longifolia*, Hook. Fl. Exot. ii. t. 133, is *C. longifolia* var. *brevipes*, Benth. Fl. Hongk. 270, which has subsessile obtuse-based linear-lanceolate leaves, glabrous calyx, &c.

2036 VAR. *lanceolaria*; leaves narrower thinner mature beneath glabrate densely minutely glandular-dotted. C. lanceolaria, *Roxb. Fl. Ind.* i. 395; *Wall. Cat.* 1829. C. lanceolaria, Var. α subglabrata. *Schauer l. c. excl. syn.*—E. Bengal; in the plains, common; also in the Khasia, Chittagong Hills up to 3000 ft., plentiful. (W. Malaya.) —Cymes laxer, flowers and fruits smaller, than in the type. The abundant material for this common plant is very uniform; except that, while the leaves are generally regularly serrulate, a form with them subentire appears in Chittagong, and is common in the Malay Peninsula and islands.

12. **C. acuminata,** *Roxb. Fl. Ind.* i. 394; shrubby, innovations stellately white-tomentose, leaves broadly lanceolate acuminate denticulate, panicles axillary long-peduncled dichotomous shorter than the leaves.

SILHET; *Roxburgh*.

Leaves 4–5 by 2 in., mature glabrate reticulate above, hairy beneath. *Peduncles* longer than in the other species.—Not seen; the foregoing copied from Roxburgh. Schauer reduces this to *C. longifolia*; but there is no form of that known with the peduncles longer than in the other species described by him. His description points altogether to *C. Reevesii*, for which the locality does not suit. Possibly Roxburgh's specimen was a cultivated one, as *C. Reevesii* has been long cultivated.

X. TECTONA, *Linn. f.*

Trees, stellately tomentose. *Leaves* opposite or whorled, large, petioled, entire. *Cymes* dichotomous, many-fld., in large terminal panicles; bracts small, narrow. *Calyx* campanulate, shortly 5–6-lobed, in fruit enlarged ovoid or urceolate. *Corolla* small, tube short; limb equally 5–6-lobed, spreading. *Stamens* as many as corolla-lobes, on the corolla-tube; anthers exserted, oblong. *Ovary* 4-celled, cells 1-ovuled; style linear, tip shortly bifid. *Drupe* enclosed in the calyx, 4-celled; endocarp bony. *Seeds* erect, oblong.—Species 3, the following and a Philippine Island one.

1. **T. grandis,** *Linn. f. Suppl.* 151; leaves opposite ovate mature

scabrous or subglabrate above, calyx in fruit 1 in. diam. ovoid membranous. *Gaertn. Fruct.* i. 275, t. 57; *Roxb. Cor. Pl.* i. 10, t. 6, and *Fl. Ind.* i. 600; *Wall. Cat.* 772; *Graham Cat. Pl. Bomb.* 158; *Schauer in DC. Prodr.* xi. 629; *Dalz. & Gibs. Bomb. Fl.* 199; *Bocq. Rev. Verb.* 99, t. 10; *Bedd. Fl. Sylv.* t. 250 (two); *Brand. For. Fl.* 354, t. 44; *Kurz For. Fl.* ii. 259; *Gamble Indian Timbers,* 283.—Theka, *Juss. Gen.* 108; *Lamk. Ill.* t. 136.—*Rumph. Herb. Amb.* iii. t. 18; *Rheede Hort. Mal.* iv. t. 27.

W. DECCAN PENINSULA, alt. 500–4000 ft., common; from CENTRAL INDIA to ORISSA. MALAY PENINSULA, alt. 500–4000 ft.; from Burma (common) to Malacca. —DISTRIB. Sumatra, Java.

A tree, 80–150 ft.; branchlets quadrangular, stellately tomentose. *Leaves* 12 by 8 in. (of seedlings sometimes 3 ft.), cuneate at both ends, mature with hard close tomentum beneath; petiole 1 in. *Panicles* 18 in. diam., and more; flowers very numerous, but only a few fertile; bracts $\frac{1}{2}$ by $\frac{1}{10}$ in., deciduous, with also usually some reduced leaves at the forks. *Calyx* (in flower) $\frac{1}{8}$–$\frac{1}{6}$ in., lobed less than half-way down, stellately white-tomentose. *Corolla* scarcely $\frac{1}{4}$ in. long, white, glabrous in the throat. *Drupe* $\frac{2}{3}$ in. diam.; cells 4 with a central cavity, densely hirsute; calyx in fruit ovoid or subpyramidal, membranous, often reticulately-nerved nearly glabrous, mouth very small.—Teak.

2. **T. Hamiltoniana,** *Wall. Pl. As. Rar.* iii. 68, t. 294, and *Cat.* 773; leaves mostly ternate whorled, ovate mature scabrid above, calyx in fruit $\frac{1}{3}$ in. diam. narrowly urceolate densely woolly. *Walp. Rep.* iv. 99; *Schauer in DC. Prodr.* xi. 629 (excl. the Philippine Island plant); *Kurz For. Fl.* ii. 259; *Gamble Indian Timbers,* 293. Theka ternifolia, *Ham. in Trans. Linn. Soc.* xvii. 185.

BURMA, at Prome; *Wallich, Kurz.*—DISTRIB. Ava.

A small tree, 30–40 ft.; branchlets 6–8-angular. *Leaves* sometimes opposite or 4-nate, 8 by 5 in., base rhomboid or obtuse, white tomentose beneath or ultimately softly hairy; petiole $\frac{3}{8}$ in. *Panicle* 6–12 in., stellately woolly; branches ascending. *Calyx* (in flower) $\frac{1}{6}$ in., lobed scarcely half-way down. *Corolla* $\frac{1}{3}$ in. long, throat very hairy; lobes pale blue. *Drupe* $\frac{1}{4}$ by $\frac{1}{8}$ in., glabrous or with some soft wool, 4-celled without a central cavity; calyx in fruit $\frac{1}{3}$ by $\frac{1}{5}$ in., narrower upwards.—This tree flowers before the leaves are fully developed.

XI. **PREMNA,** *Linn.*

Trees or shrubs, sometimes climbing. *Leaves* opposite, entire or toothed. *Cymes* corymbose or panicled, sometimes thyrsoid, pubescent; bracts small, narrow. *Flowers* often polygamous, greenish or yellowish white, small (in *P. cordifolia* and *P. corymbosa* rather larger, then scarcely $\frac{1}{4}$ in. long). *Calyx* small, cup-shaped, subentire or minutely 2–5-toothed, subequal or 2-lipped. *Corolla* tubular, throat hairy; limb 2-lipped, 5-lobed, or subequally 4-lobed. *Stamens* 4, didynamous. *Ovary* 2- or 4-celled, 4-ovuled; style linear, shortly bifid. *Drupe* small, surrounded below by the calyx, globose or oblong-obovoid; endocarp hard undivided 1–4-celled 1–4-seeded. *Seeds* oblong.—Species 40, chiefly Indian.

* Calyx 2-lipped or subtruncate, lips subentire.

† *Cymes forming an elongate interrupted thyrse.*

1. **P. racemosa,** *Wall. Cat.* 1777; leaves petioled ovate or obovate acuminate, spikes simple densely shortly villous, calyx minutely hairy or glabrate. *Schauer in DC. Prodr.* xi. 633; *Brand. For. Fl.* 367; *Kurz For. Fl.* ii. 263.

KHASIA MTS., alt. 3–5000 ft.; *Wallich, Griffith* (Kew Distrib. n. 6023); *H. f. & T.*, &c. TENASSERIM (*Kurz*).

A small tree, 10–30 ft.; innovations minutely fulvous-villous. *Leaves* 3 by $1\frac{1}{2}$ in., obscurely crenate, mature nearly glabrous, nerves 4–5 pair; petiole $\frac{1}{4}$ in. *Spikes* 2–5 in.; bracts $\frac{1}{3}$ in., elliptic, nerved, whitened, deciduous, or much smaller inconspicuous. *Calyx* $\frac{1}{18}$ in., usually whitened upwards, glabrate, lobed half-way down into 2 rounded lips, or subtruncate and very shallowly lobed. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., greenish-white, mouth subequally 4-lobed, throat very hairy. *Ovary* nearly glabrous at the tip. *Drupe* $\frac{1}{6}$ in., mostly 1-seeded, narrowly obovoid.

2. **P. interrupta,** *Wall. Cat.* 1778; leaves subsessile ovate or obovate very shortly acuminate, spikes simple densely shortly villous, calyx puberulous or glabrate. *Schauer in DC. Prodr.* xi. 633; *Brand. For. Fl.* 367.

TEMPERATE HIMALAYA, frequent, alt. 5–8000 ft., from Kumaon, *Strachey & Winterbottom*, to Sikkim, *J. D. H.*

A small tree, 10–30 ft., resembling *P. racemosa* very closely, except in the larger subsessile leaves. *Leaves*, those next the spikes 9 by $4\frac{3}{4}$ in., sometimes 6 by 3 in.; petiole $\frac{1}{3}$–$\frac{1}{6}$ in., broadly channelled. *Spikes* as of *P. racemosa*, but rather larger; bracts $\frac{1}{2}$ in., whitened, nervose, or inconspicuous. *Corolla* hairy in the throat. *Drupe* (the few examined) 1-seeded, rather shorter and broader than in *P. racemosa.*—Gamble (Darjeeling List, 61, and Indian Timbers, 293) says that this and the next are large climbers, and it is very probable that they are so sometimes. But Gamble's plants being published with imperfect diagnoses, and some being wrongly identified, the information regarding others is doubtful.

3. **P. bracteata,** *Wall. Cat.* 1772; leaves short-petioled elliptic or obovate acuminate at both ends, spikes panicled and calyx densely puberulous. P. racemosa, *Gamble Darjeeling List*, 61 ?, *not of Wall.* Labiata? *Griff. Itin. Notes* 199, n. 1138.

SUBTROPICAL SIKKIM, alt. 2–3000 ft.; *J. D. H.*, &c. BHOTAN; *Griffith* (Kew Distrib. n. 6022). KHASIA MTS., alt. 4000 ft.; *Wallich, Griffith, H. f. & T.*

A tree, 40 ft.; innovations densely cinereous pubescent. *Leaves* 9 by $3\frac{3}{4}$ in., subentire, mature glabrate, nerves 8 pair; petiole $\frac{1}{4}$ in., somewhat winged, or 0. *Panicles* 7 by 4 in.; bracts $\frac{1}{2}$ in., broadly lanceolate, acute, or 0; cymes mostly in distant capitate whorls on the panicle branches. *Calyx* $\frac{1}{20}$ in.; lips entire shallow, or sometimes one minutely 2-toothed, the other still more obscurely 3-toothed. *Corolla* $\frac{1}{8}$ in., white, as of *P. interrupta* but smaller, hardly hairy in the throat. *Drupe* not seen.

†† *Cymes in compound corymbs.*

4. **P. cordifolia,** *Roxb. Fl. Ind.* iii. 78; leaves subcordate-ovate acuminate, corymb dense, pedicels very short hairy, corolla $\frac{1}{4}$ in. tube cylindric densely hairy nearly to the base. *Walp. Rep.* iv. 94; *Schauer in DC. Prodr.* xi. 632 *partly, not of Wight or Beddome.*

PENANG; *Roxburgh.* SINGAPORE; *Lobb.*

A shrub, 6–8 ft. *Leaves* 6 by 3 in., subentire, drying red, mature nearly glabrous, nerves 5–6 pair; petiole 1 in., fulvous-puberulous. *Corymb* 3–5 in. diam., many-fld.; bracts $\frac{1}{6}$ in., lanceolate, acute; branches thick, shortly yellow-hirsute. *Calyx* $\frac{1}{10}$ in., scabridly puberulous, 2-lipped; lips broad, rounded. *Corolla-tube* twice as long as the calyx, densely filled with hair within in the lower part; limb 2-lipped. *Ovary* glabrous at the tip. *Drupe* $\frac{1}{4}$ in. diam., subglobose, usually 3–4-seeded.—Schauer's diagnosis is taken from Roxburgh; his description mainly from *P. Perrottetii.* P. cordifolia, *Wall. Cat.* 2467, is not in Wallich's Herbarium; but, as it came from Gongachora, it is very unlikely to have been *P. cordifolia*, Roxb.

5. **P. corymbosa,** *Rottl. & Willd. in Gesell. Nat. Freunde Neue Schr.* iv. (1803) 187, 188; leaves subcordate-ovate acuminate undulate, panicles dense branches dichotomous slender glabrate coloured, corolla $\frac{1}{8}$ in. tube cylindric hairy near the top. P. densiflora, *Wall. Cat.* 1773. P. cordifolia, *Wight Ic.* t. 1483; *Bedd. For. Man.* 172; *Schauer in DC. Prodr.* xi. 632, *partly*; *Dalz. & Gibs. Bomb. Fl.* 199 ?, *not of Roxb.* P. truncata, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 215, *ex. descr.* Cornutia corymbosa, *Burm. Fl. Ind.* 133, t. 41, fig. 1, *not of Lamk.*

CARNATIC; *Wight, Shuter*; Cuddapah Hills, *Beddome.* CEYLON; *Burmann, Thwaites*, C. P. n. 193.

Leaves 3½ by 1¾ in., young sometimes woolly, mature nearly glabrous, upper surface impressed reticulate; petiole 1 in., pubescent. *Panicles* small, pyramidal, very dense, brachiate, patently deciduously pubescent with simple hairs; bracts narrowly lanceolate. *Calyx* $\frac{1}{10}$ in., early glabrate; in fruit enlarged, 2-lipped, membranous or whitened. *Corolla* tubular, limb subequally 4-lobed. *Drupe* $\frac{1}{6}$ in., obovoid, 3–4-seeded.

6. **P. coriacea,** *Clarke*; leaves cordate ovate or orbicular shortly acuminate mature coriaceous glabrous, corymbs large compound, corolla $\frac{1}{8}$ in. P. cordifolia, *Grah. Cat. Pl. Bomb.* 155, *not of Roxb.* P. scandens, *Dalz. & Gibs. Bomb. Fl.* 199, *not of Roxb.*

W. DECCAN PENINSULA, in the Ghauts, from Bombay to Cochin, common; *Wight, Graham, Hohenacker*, &c.

A large climber (Ritchie) or a tree (Graham). *Leaves* 5 by 3½ in., entire, mature very shining smooth, nerves 4–5 pair; petiole 1 in. *Corymb* 8 in. diam., 3 in. high, closely shortly hairy; bracts $\frac{1}{8}$ in., lanceolate, scattered. *Calyx* $\frac{1}{12}$ in, cup-shaped, truncate, hardly 2-lipped, minutely pubescent. *Corolla* greenish-yellow, throat hairy. *Drupe* $\frac{1}{6}$ in., 1-seeded, narrowly obovoid.

VAR. *oblonga*; leaves elliptic or oblong often caudate. P. scandens, *Wall. Cat.* 1774, *partly.* Premna n. 23, *Herb. Ind. Or. H.f. & T.*—Khasia Terai; *H.f. & T.* Nathpur; *Hamilton.* Sikkim Terai; *Clarke.*—A tree, 20–40 ft.

VAR. *cuneata*; leaves oblong base cuneate often caudate. Premna n. 23, *Herb. Ind. Or. H.f. & T.*—Khasia Terai; Silhet and Pundua, *H. f. & T.*

7. **P. villosa,** *Clarke*; leaves cordate-ovate shortly acuminate mature densely villous beneath, corymbs large compound closely pubescent, corolla $\frac{1}{8}$ in.—Premna n. 25, *Herb. Ind. Or. H.f. & T.*

DECCAN PENINSULA; Mts. of Kurg, *Wight, G. Thomson*; Wynaad, alt. 3000 ft., *Beddome.*

A tree (or a large climber, *Beddome*), closely resembling *P. coriacea* except as to the indumentum. *Leaves* (mature) densely villous with simple straight hairs beneath, most copiously on the nerves, glabrate above; petiole 2 in. *Corymb, calyx, corolla,* and young *drupe* as of *P. coriacea,* of which this may be a var., as Beddome suspects.

8. **P. scandens,** *Roxb. Fl. Ind.* iii. 82; leaves petioled elliptic and acuminate or lanceolate entire membranous glabrous, corymbs large compound lax puberulous many-fld., calyx subentire membranous in fruit, corolla scarcely $\frac{1}{8}$ in. *Schauer in DC. Prodr.* xi. 632; *Kurz For. Fl.* ii. 263. P. ramosa, *Wall. Cat.* 1774.—Premna n. 24, *Herb. Ind. Or. H.f. & T.*

TERAI of N. and E. BENGAL, frequent; SIKKIM, *J. D. H.*, &c.; BHOTAN and ASSAM, *Griffith* (Kew Distrib. n. 6034). SILHET; *Roxburgh, Wallich*; CACHAR, *Keenan.* MARTABAN; *Kurz.*

A tree, 20–40 ft., or (fide *Roxburgh*) a large climber. *Leaves* 11 by 4 in., base rounded or cuneate, nerves 6 pair; petiole 1½ in., glabrous. *Corymbs* 4–10 in. diam.

Calyx $\frac{1}{20}$ in., cup-shaped, nearly glabrous at flower-time. *Corolla* bearded in the throat. *Drupe* (fide Roxburgh) size of a pea, globose, tubercled.—The immature drupes appear narrowly obovoid, and the plant hardly to differ from *P. coriacea* var. *oblonga*, except in the thinner texture. Roxburgh says the petioles are sometimes hairy; from which it may be doubted whether he did not erroneously refer other things to this species. I cannot satisfactorily identify from the descriptions the *P. scandens & cordifolia* of Brandis For. Flora.

9. **P. purpurascens,** *Thwaites Enum.* 242; leaves broadly oblong suddenly shortly acuminate entire glabrous, corymbs large closely pubescent, calyx small truncate cinereous-pubescent.

CEYLON; Ambagamowa District, *Thwaites.*

A large climber. *Leaves* 4½ by 2¼ in., suddenly subobtusely acuminate, base obtuse or subcordate, mature fulvous-puberulous on the nerves beneath or glabrate; nerves 8 pair; petiole 1 in. *Corymbs* 6 in., straggling, with many small flowers clustered at the ends of the branches. *Calyx* $\frac{1}{30}$ in., obscurely 2-lipped. *Corolla* $\frac{1}{12}$ in., subequally 4-lobed, pale-purple, *Thwaites. Drupe* not seen.

VAR.? *paucinervis*; nerves 3–4 pair, not inarching except very close to the margin.—Anamallays, alt. 3000 ft., *Beddome.*—A gigantic climber with the purple colour of Thwaites' *P. purpurascens* by Beddome, and referred doubtfully thereto by him. Beddome's specimen is very immature, but the nervation of the leaves is unlike that of *P. purpurascens,* and may indicate a new species.

** Calyx 2-lipped, one lip 2-toothed, the other subentire.

10. **P. integrifolia,** *Linn. Mant.* 252 (excl. syn. Burm.); leaves broadly oblong or ovate subobtuse undulate or coarsely toothed mature glabrous, corymbs dense minutely hairy, calyx sparsely minutely pubescent or scabrid puberulous. *Wight Ic.* t. 1469; *Brand. For. Fl.* 366. P. serratifolia, *Linn. l. c.* 253; *Wall. Cat.* 1767; *Schauer in DC. Prodr.* xi. 632; *Bedd. For. Man.* 172; *Kurz For. Fl.* ii. 263. P. spinosa, *Roxb. Fl. Ind.* iii. 77. P. sambucina, *Wall. Cat.* 1775; *Schauer l. c.* 631; *Kurz l. c.* 261. P. viburnoides, *Wall. Cat.* 2646, *letter* C. P. subcordata, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 216. P. ovalifolia, *Wall. Cat.* 1782.—Gumira littorea, *Rumph. Herb. Amb.* iii. 209, t. 134. G. integrifolia, *Hassk. Hort. Bogor.* 135.

INDIA, near the sea from Bombay to Malacca. SILHET; *Wallich.* CEYLON. ANDAMANS; and NICOBARS, *Kurz.*—DISTRIB. Malaya.

A small tree, or shrub; trunk and large branches often spinous, branchlets unarmed. *Leaves* 4 by 2¼ in. (sometimes 1 by ½ in.), subobtusely very shortly acuminate or obtuse, sometimes obovate, entire sinuate or in the upper half with a few coarse teeth, mature glabrous or minutely hairy on the nerves above or beside the nerves beneath; nerves 4–5 pair; petiole ¾ in., usually somewhat pubescent. *Corymbs* 2–4 in. diam., short-peduncled, minutely cinereous-pubescent, and often with some fulvous deciduous hair; bracts $\frac{1}{16}$ in., lanceolate, pubescent. *Calyx* $\frac{1}{16}$ in., 3-toothed. *Corolla* ⅛ in., greenish-white, throat hairy, subequally 4-lobed. *Drupe* ⅛ in. diam., globose, 3–4-seeded.—Some of the synonyms cited above are uncertain; specimens with the calyx at all distinctly 5-toothed (rather than 3-toothed) must be referred to *P. latifolia*, Roxb.: it may be doubted whether any of the examples said to have come (Brandis l. c.) from Oudh and Gurwhal belong here. Gamble, however, says (Darjeeling List, 60, and Indian Timbers, 295) that the tree is found in the Sikkim Terai; and as he describes the tree as thorny, it would appear that he identified it correctly.

VAR. *angustior*; leaves elliptic narrowed at both ends obtuse, corymbs small.—Malacca; *Griffith* (Kew Distrib. n. 6030).—*Leaves* 2½ by ¾ in., widest about the middle. *Corymbs* numerous, 1–2 in. diam.

11. **P. parasitica,** *Blume Bijd.* 816; leaves ovate or obovate very

shortly acuminate entire glabrous, corymbs nearly glabrous, flowers mostly sessile, calyx nearly glabrous. *Schauer in DC. Prodr.* xi. 633. P. trichostoma, *Miq. Fl. Ind. Bat.* ii. 892.

MALACCA; *Griffith* (Kew Distrib. n. 6019). TENASSERIM; *Helfer*. SINGAPORE; *G. Thomson*.—DISTRIB. Java, Borneo.

A large climber. *Leaves* 5½ by 3 in., base obtuse or cordate, nerves 5 pair; petiole ¾ in. *Corymbs* 3–4 in. diam., puberulous, hardly pubescent; branches somewhat thick, bracts deciduous. *Calyx* $\frac{1}{20}$ in., 2-lipped, usually membranous, glabrous after flowering; one lip shortly 2-fid, the other subentire. *Drupe* not seen.

12. **P. divaricata,** *Wall. Cat.* 1781; leaves ovate acuminate entire mature nearly glabrous, corymbs compound many-fld. pubescent, calyx subtruncate with 2 minute teeth. *Schauer in DC. Prodr.* xi. 633. P. lucidula, *Kurz For. Fl.* ii. 263 (? *of Miquel*).—Premna n. 33, *Herb. Ind. Or. H.f. & T.*

MERGUI; *Griffith*. MALACCA; *Maingay* (Kew Distrib. n. 1198, 1199). ANDAMANS (*Kurz*).—DISTRIB. Java.

A climber. *Leaves* 5 by 2½ in., nerves 5–6 pair, usually puberulous above, beneath most obscurely dotted and sometimes pubescent; petiole ½–2½ in. *Corymbs* 3 in. diam.; bracts ⅛ in., lanceolate; flowers shortly pedicelled or sessile. *Calyx* $\frac{1}{24}$ in., broadly cup-shaped; upper lip in flower of 2 minute acute teeth, lower subentire. *Corolla* ⅛ in., throat hairy. *Drupe* ⅙ in. diam., globose, 3–4-seeded.—An authentic Javan example from Miquel of his *lucidula* has the corymbs stouter, the calyx larger, more distinctly toothed, the corolla fully ⅙ in.

13. **P. punctulata,** *Clarke*; leaves broadly elliptic suddenly shortly acuminate entire mature glabrate punctulate beneath, corymbs large pubescent, calyx closely pubescent 2-lipped, lips subequal one 2-toothed the other subentire.

MALACCA; *Maingay* (Kew Distrib. n. 1200).

Leaves 5½ by 3 in., base obtuse or rounded, nerves 4 pair; petiole 1 in. *Corymbs* 4–5 in. diam.; lower bracts ½ in., linear-oblong; flowers sessile or shortly pedicelled. *Calyx* $\frac{1}{16}$ in., closely minutely grey-pubescent; after flowering somewhat deeply 2-lipped. *Drupe* not seen.—This may be *P. ceramensis* (Miq. Fl. Ind. Bat. ii. 893), of which no authentic specimen is at Kew.

14. **P. khasiana,** *Clarke*; leaves large ovate caudate-acuminate entire glabrous nerves pubescent above, corymbs large lax pubescent, calyx 2-lipped sub-5-toothed.

KHASIA MTS., alt. 4300 ft.; Jasper Hill near Cherra, *H.f. & T.*

Subscandent (Hooker). *Leaves* 7 by 4½ in., base obtuse, shining, subcoriaceous, young scarcely pubescent beneath, nerves 7 pair; petiole 1½ in., pubescent. *Corymbs* 6 in. diam., straggling, closely pubescent with simple hairs and minute scales; bracts ⅓ in., linear. *Calyx* $\frac{1}{16}$–$\frac{1}{12}$ in., pubescent; one lip distinctly 2-toothed, the other more shortly 3-toothed or subentire. *Corolla* ⅛ in., subequally 4-lobed, glabrous without, throat somewhat hairy. *Drupe* not seen.—From the subcoriaceous, shining, much acuminate large leaves and scandent habit, the true affinity of this may be near *P. coriacea*; but the artificial sectional character taken from the calyx does not allow it to stand there.

15. **P. longifolia,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 79, *not of Wall. nor of Schauer*; leaves large long-petioled ovate acute entire mature glabrate, corymbs compound pubescent, calyx 2-lipped lower lip shorter subentire or obscurely 3-toothed. *Walp. Rep.* iv. 93.

BENGAL; *Roxburgh*.

A tree. *Leaves* 9 by 4½ in., base obtuse or subcordate, mature glabrate epunctate,

a little yellow hair clinging to the sides of the midrib beneath; nerves 6 pair, secondary reticulating nerves conspicuous; petiole $2\frac{1}{2}$ in. *Corymbs* terminal, short-peduncled, 3–4 in. diam., closely pubescent and with some deciduous fulvous hairs, exceedingly like *P. integrifolia*, but rather larger. *Calyx* $\frac{1}{10}$ in., in fruit 3-toothed, closely scabrid-puberulous. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., greenish-white, hairy in the throat. *Drupe* $\frac{1}{8}$ in. diam., globose, 4-seeded (Roxburgh).—The two examples of Roxburgh, one named by himself, agree exactly with his Ic. Ined. at Kew, and with his description; and are very unlike the *P. longifolia* of Wallich, accepted as Roxburgh's by Schauer. It seems very near *P. integrifolia*, Linn.

*** Calyx 5–4-toothed, subequally or obscurely 2-lipped.

† *Leaves entire or nearly so.*

16. **P. milleflora,** *Clarke*; leaves large long-petioled ovate acute entire mature minutely crisped-pubescent on the nerves, corymb large very many-fld., calyx minutely 5-toothed.—Premna n. 30, *Herb. Ind. Or. H. f. & T.*

ASSAM; *Griffith* (Kew Distrib. n. 6028); Upper Assam, *Jenkins*.

Generally resembling *P. longifolia*, Roxb., but with a very large dense corymb of very small flowers. *Leaves* 7 by 4 in., base rhomboid, mature minutely pubescent on the nerves (primary and secondary) beneath, nerves 8 pair; petiole $2\frac{1}{2}$ in. *Corymb* a foot diam., about 2000-flowered (in Griffith's n. 320), and *calyx* ($\frac{1}{24}$ in.), minutely pubescent. *Corolla* $\frac{1}{12}$ in., throat hairy. *Drupe* $\frac{1}{8}$ in., globose.

17. **P. tomentosa,** *Willd. Sp. Pl.* iii. 314; leaves ovate acuminate entire mature stellate-woolly beneath, corymbs panicled densely stellate-woolly, calyx shortly 5-fid, ovary upwards very hairy. *Roxb. Fl. Ind.* iii. 76; *Wall. Cat.* 1769; *Schauer in DC. Prodr.* xi. 634; *Wight Ic.* t. 1468; *Bedd. Fl. Sylv.* t. 251; *Brand. For. Fl.* 367. P. flavescens, *Juss. in Ann. Mus. d'Hist. Nat.* vii. 77, *not of Wall.* Cornutia corymbosa, *Lamk. Dict.* i. 54, *not of Burm.*

DECCAN PENINSULA and CEYLON, frequent; from the Circars and Central Provinces southward.

A tree, often 50 ft.; branchlets densely stellate-woolly. *Leaves* 6 by $3\frac{1}{2}$ in., base rounded or subcordate, coriaceous, minutely glandular scabrous above, nerves 7 pair; petiole 1 in. *Corymbs* $\frac{3}{4}$ in. diam., often sessile, upper branches (or nearly all) alternate; bracts $\frac{1}{5}$ in., linear. *Calyx* $\frac{1}{10}$ in., stellately woolly. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., 2-lipped, hairy in the throat, greenish-yellow. *Drupe* $\frac{1}{4}$ in. diam., deciduously hairy, ovoid, 3–1-seeded.—This is certainly *P. tomentosa* of Roxb., but whether of Willd. may be questioned. Willdenow founds his plant as a syn. of *Cornutia corymbosa*, Lamk. Lamarck does not say whether it was the same as *Cornutia corymbosa*, Burm. If it was the same, which from the description seems not improbable, then *Premna tomentosa*, Willd., is a mere syn. of *P. corymbosa*.

VAR. *detergibilis*; mature leaves with most of the wool rubbed off. P. latifolia, *Thwaites Enum.* 242, *not of Roxb.*—Ceylon; Thwaites, C. P. n. 2893.

18. **P. pyramidata,** *Wall. Cat.* 1779; leaves large ovate very shortly acuminate subentire mature glabrous above hairy and somewhat woolly beneath, panicles pyramidal many-fld. stellately villous. *Schauer in DC. Prodr.* xi. 633. P. tomentosa, *Kurz For. Fl.* ii. 260; *Gamble Indian Timbers*, 294.

TAVOY and AMHERST; *Wallich*.—DISTRIB. Java?

A large tree (*Wallich*). *Leaves* 8 by 5 in., from ovate to orbicular, base obtuse sometimes subcordate, nerves 7 pair; petiole $1\frac{1}{2}$ in., stellately villous. *Panicles* 6 in. diam.; branches opposite, ascending, peduncles $1\frac{1}{2}$ in., flowers crowded at the ends of the branches; bracts $\frac{1}{5}$ in., linear, numerous. *Calyx* $\frac{1}{12}$ in., distinctly 5-toothed at flower-time, stellately villous. *Corolla* $\frac{1}{4}$ in., or rather more, stellately villous with-

out. *Drupe* 1/3 in. diam., globose, glabrous.—Brandis and Kurz consider this the same as *P. tomentosa*; but the rounded shoulders of the leaves, and the brachiate panicles give it a very different aspect; and the drupe marks it a distinct species. The Javan *P. tomentosa*, Blume (Bijd. 816), is nearly allied to this.

19. **P. bengalensis,** *Clarke*; leaves ovate or narrowly elliptic acuminate entire mature stellately pubescent on the nerves, corymbs spreading stellately pubescent or tomentose, calyx shortly 5-toothed. C. longifolia, *Wall. Cat.* 1771; *Schauer in DC. Prodr.* xi. 634.

Throughout BENGAL PLAIN, alt. 0–1000 ft., common; extending to the SIKKIM TERAI, ASSAM and CACHAR; *Wallich, Griffith* (Kew Distrib. n. 6029), &c.

A large shrub, or a tree, 30 ft.; shoots stellately tomentose. *Leaves* 8 by 3½ in., ovate, or 5 by 2 in. obovate-oblong, mature with minute scattered stellate hair on the surface beneath or glabrous except the 7-8 pair of nerves; petiole 1 in. *Corymb* 4–8 in. diam., closely stellate-tomentose without any patent hairs; bracts ¼ in., linear. *Calyx* 1/12 in. *Corolla* 1/8–1/6 in., 2-lipped, yellowish or greenish white, throat hairy. *Drupe* 1/8–1/5 in., globose or somewhat obovoid.—This has been supposed to be *P. pubescens*, Blume, in which the leaves are described as repand-toothed, and the pubescence of the corymb as simple.

20. **P. punduana,** *Wall. Cat.* 2651; leaves elliptic acuminate entire nerves stellately tomentose, panicle-branches elongate raceme-like, calyx minutely 5-toothed stellately tomentose. *Schauer in DC. Prodr.* xi. 637. —Premna n. 26, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; below Churra, *Wallich, Griffith, H. f. & T.*, &c.

A large shrub; shoots stellately tomentose. *Leaves* 8 by 3 in., base cuneate, mature punctulate glabrate on both surfaces, nerves 7 pair; petiole 1¼ in. *Panicles* 6-8 in., pyramidal, densely stellate-tomentose; branches mostly opposite, often 3 by 1 in.; bracts ¼–⅓ in., linear-lanceolate, numerous, persistent, conspicuous. *Calyx* 1/12 in., obscurely 2-lipped, the 3 teeth of the lower lip wider apart (at flower-time) than those of the upper, but hardly shorter. *Corolla* 1/8–1/6 in., 2-lipped; lobes stellately tomentose without. *Drupe* 1/6–1/5 in., globose.

21. **P. integerrima,** *Wight Ic.* t. 1484; leaves large oblong acuminate entire glabrous, corymbs large minutely closely pubescent, calyx very shortly 5-toothed minutely pubescent. *Bedd. For. Man.* 172.

S. DECCAN PENINSULA; Courtallum, *Wight*; Mts. of Kurg, *G. Thomson*; Tinnevelly Mts., *Beddome*.

A shrub, 6 ft. *Leaves* 7 by 2½ in., base obtuse or cuneate, entire or (fide *Beddome*) sometimes serrate, nerves 5 pair; petiole ½ in. *Corymbs* 5 in. diam.; bracts ⅓ in.; broad-lanceolate. *Calyx* 1/16–1/12 in.; lobes very small, obtuse or broadly triangular. *Corolla* 1/8–1/6 in., 2-lipped. *Drupe* not seen.

22. **P. latifolia,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 76; leaves cordate-ovate shortly acuminate undulate young softly minutely hairy on both surfaces, corymbs closely simply villous, calyx strigose shortly 5-toothed much enlarged in fruit. *Schauer in DC. Prodr.* xi. 635.

Lower hills of the COROMANDEL COAST and BENGAL; from Rajmahl to the Southern Circars; *Roxburgh*, &c.

A small, poor tree, attaining 25 ft. *Leaves* 4 by 2½ in., usually smaller, base (in the type form) shallowly cordate but then usually with a small cuneate decurrence on the petiole, entire, rarely serrate, dusky pubescent, drying blackish above cinereous beneath, mature usually pubescent at least on the nerves; nerves 7 pair, reticulations distinct; petiole ⅓ in. *Corymbs* 2-3 in. diam., hardly brachiate; bracts small, deciduous. *Calyx* 1/12 in., in fruit often nearly ¼ in. diam. *Corolla* ⅛–1/6 in., 2-lipped, densely hairy in the throat. *Drupe* ⅛ in. diam., globose, hardly verrucose.—

Roxburgh grounds his species on the cordate base of the leaves: this form appears confined to the Coromandel Hills.

VAR. *cuneata*; leaf-base rhomboid or cuneate, calyx strigose. P. viburnoides, *Kurz For. Fl.* ii. 261.—Pegu; *Kurz.* Burma; *Griffith* (Kew Distrib. n. 6035).—A small tree of the dusky sombre colour of *P. latifolia* Roxb. type, the leaves drying blue-black above, ashy beneath, often very pubescent when young.

VAR. *mollissima*; leaves small base obtuse or rhomboid, corymbs 1½ in. diam. P. mollissima, *Roth Nov. Sp.* 287; *Schauer in DC. Prodr.* xi. 638. P. viburnoides, *Wall. Cat.* 2646, *letter* a *only*; *Schauer l. c.* 635, *chiefly*.—Madras; *Wight*.—This looks like a burnt-up form of Var. *cuneata*, than which it is not more hairy, but has smaller calyx and corolla.

VAR. *mucronata*; leaves cuneate at both ends mature minutely pubescent on the midrib beneath, corymbs somewhat broad rusty-pubescent, calyx subpatently pubescent. P. mucronata, *Roxb. Fl. Ind.* iii. 635; *Wall. Cat.* 1766; *Schauer in DC. Prodr.* xi. 635; *Brand. For. Fl.* 366.—N. India from Kumaon to Bhotan and the Khasia Mts., ascending to 5000 ft., and spreading into Bengal Plain, common, *Wallich, H. f. & T.*, &c.—This could not be distinguished from *P. latifolia* by Wallich or Brandis, and seems to be a state of *P. latifolia* grown in a moister soil. The leaves are often 6 in. long, the drupes larger and more verrucose.

VAR. *viburnoides*, Wall. Cat. 2646, letter *b* only; leaves ovate base rhomboid glabrate drying green surfaces concolorous. *Schauer in DC. Prodr.* xi. 635, *in small part.* P. latifolia, *Wight Ic.* t. 869.—S. Deccan Peninsula; Cochin and Gingee Hills, *Wight*; near Madras, *G. Thomson.*—Leaves broad, not cordate, nearly glabrous even when young.—This may be a distinct species; the green colour easily separates it from all the preceding forms of *P. latifolia.*

23. **P. flavescens,** *Ham.*; *Wall. Cat.* 2649; leaves ovate or obovate acuminate entire mature setulose above villous beneath, corymbs large densely pubescent, calyx closely pubescent shortly 5-toothed.

E. BENGAL; Goalpara, *Hamilton*; Dacca, *Clarke.*

A shrub or a small tree; shoots villous or woolly. *Leaves* 6 by 2½ in., base obtuse or subcordate, upper surface with minute scattered hairs erect from the reticulating nerves; nerves 7 pair; petiole 1 in. *Corymbs* 4–7 in. diam., usually rusty-villous; bracts ¼ in., linear. *Calyx* $\frac{1}{12}$ in. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., 2-lipped, very hairy below within. *Drupe* ⅛ in.

VAR. *glabrior*; leaves setulose above sparingly pubescent or glabrate beneath green. Premna n. 24, *Herb. Ind. Or. H. f. & T.*—Subtropical Sikkim, alt. 3000 ft., *Clarke.* Silhet; *H. f. & T.*

VAR. *rubens*; leaves setulose above glabrate beneath drying usually reddish. Premna n. 32, *Herb. Ind. Or. H. f. & T.*—Malacca; *Griffith* (Kew Distrib. n. 6020). (Java.)—Possibly a distinct species; but, except as to the colour of the leaves, no diagnostic mark has been found to separate it from Var. *glabrior.*

24. **P. micrantha,** *Schauer in DC. Prodr.* xi. 635; leaves ovate acuminate entire mature setulose above somewhat pubescent beneath, corymbs compound minutely pubescent, calyx very small minutely 5-toothed. P. scandens, *Wall. Cat.* 1774, *in small part.*

SILHET; *Wallich.*

Leaves 3¼ by 1¾ in., base rounded. *Calyx* $\frac{1}{24}$–$\frac{1}{18}$ in. when the flower is expanded.—This very closely resembles *P. flavescens*, Ham., and may be a form of it; it differs in the very small calyx. The bristliness of the upper surface of the leaves is peculiar to *P. flavescens* and *P. micrantha* among *Premnas.*

25. **P. Wightiana,** *Schauer in DC. Prodr.* xi. 635; leaves ovate shortly acuminate subentire mature sparsely pubescent above, panicles narrow subthyrsoid in fruit minutely thinly scabrid-pubescent, calyx-teeth 5 subequal ovate or triangular. P. thyrsiflora, *Heyne*; *Wall. Cat.* 1770.

S. DECCAN PENINSULA; *Heyne*; Sira Mullee, *Wight*; Anamallay Mts., *Beddome.* Appears a large rambling or subscandent shrub. *Leaves* 3 by 2 in. (mostly smaller), membranous, base obtuse or subcordate, undulate, rarely shallowly crenate, mature nearly glabrous beneath; nerves 5 pair, secondary distinct; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicle* 1$\frac{1}{2}$ in., pyramidal; in fruit often 2–3 in., oblong; bracts $\frac{1}{10}$ in., lanceolate, persistent, nearly glabrous. *Calyx* $\frac{1}{12}$ in, minutely scabrid, hardly pubescent. *Corolla* $\frac{1}{4}$ in., glabrate without, subequally 4-fid. *Drupe* $\frac{1}{6}$ in., obovoid, dry tubercular-rugose.

26. **P. Thwaitesii,** *Clarke*; leaves ovate acuminate entire or remotely crenate softly hairy beneath, panicles subthyrsoid densely shortly villous, calyx shortly subequally 5-toothed. P. micrantha, *Thwaites Enum.* 242, *not of Schauer.*

CEYLON; *Thwaites.*
A tree, 8–10 ft. (Thwaites). *Leaves* 3 by 1$\frac{1}{4}$ in., base cuneate, minutely hairy above, densely deciduously simply hairy beneath, nerves 5 pair; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., villous. *Panicle* 1$\frac{1}{2}$ by 1 in., densely branched; bracts $\frac{1}{6}$ in., linear, villous, persistent. *Calyx* $\frac{1}{16}$–$\frac{1}{12}$ in., minutely appressedly hairy. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., yellowish. *Drupe* $\frac{1}{8}$ in. diam., globose, smooth.—Possibly a var. of *P. Wightiana*, but not at all like *P. micrantha*, Schauer.

†† *Leaves* (*mature*) *toothed* (teeth sometimes very few in *P. barbata*).

27. **P. thyrsoidea,** *Wight Ic.* t. 1485; leaves ovate shortly acuminate serrate mature glabrate, panicle thyrsoid villous or woolly, calyx pubescent or villous shortly subequally 5-toothed.

TRAVANCORE and COURTALLUM; *Wight.*
A small tree or large shrub (Wight). *Leaves* 3$\frac{1}{2}$ by 2 in., base rhomboid or subcordate, mature minutely pubescent on the nerves or glabrous; nerves 5 pair, secondary distinct; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicle* (in flower) 4 by 2 in., densely branched; bracts subpersistent. *Calyx* $\frac{1}{10}$ in. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., glabrous without; lobes 4, subequal. *Drupe* $\frac{1}{8}$ in., globose, verrucose-tubercular.—Wight subsequently reduced this species to *P. Wightiana*, Schauer, remarking that the thyrse was much larger. This may be so, but in addition to the differences noted by Wight, the leaves are always serrate, and the indumentum differs. Beddome's description of *P. Wightiana* (For. Man. 173) is designed to include the two.

28. **P. barbata,** *Wall. Cat.* 1768; leaves oblong or ovate acuminate more or less toothed mature minutely pubescent beneath, corymbs villous with small simple hairs, calyx subequally 4-toothed glabrate or pubescent. *Schauer in DC. Prodr.* xi. 636; *Brand. For. Fl.* 366. P. cana, *Wall. Cat.* 1783.

SUBTROPICAL HIMALAYA, alt. 500–5000 ft., from Kumaon to Bhotan, frequent; *Wallich, H. f. & T.*, &c.
A small tree or a shrub. *Leaves* 6 by 1$\frac{3}{4}$–2$\frac{1}{2}$ in., base obtuse sometimes subcordate, usually distinctly toothed, sometimes with only a few teeth towards the tip, young softly minutely pubescent on both surfaces, mature nearly glabrous above, nerves 6 pair; petiole 1 in. *Corymbs* 1–2$\frac{1}{2}$ in. diam., somewhat dense, in fruit sometimes subglabrate; bracts small, linear, deciduous. *Calyx* $\frac{1}{12}$ in.; teeth oblong, obtuse. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., 2-lipped, hairy in the throat. *Drupe* $\frac{1}{6}$ in., globose or somewhat obovoid, glabrous obscurely verrucose.
VAR. *anodon*; leaves very sparingly toothed, often nearly glabrous when young.—Sikkim and Bhotan, frequent; *Clarke.*

29. **P. pinguis,** *Clarke*; leaves ovate acuminate serrate mature pubescent on the nerves, corymbs dense subsessile, calyx subequally 5-toothed glandular scarcely pubescent. Premna n. 22, *Herb. Ind. Or. H.f. & T.*

ASSAM; *Griffith* (Kew Distrib. n. 6025). KHASIA TERAI; *H. f. & T.*—DISTRIB. Ava.

An undershrub; stems 1–1½ foot (Griffith), thick, patently hairy. *Leaves* 6¼ by 4½ in., somewhat coriaceous, base rounded often cordate, serrate nearly to the base, sparsely pubescent on both surfaces when young, nerves 5 pair; petiole 1 in., pubescent or woolly. *Corymb* (in flower) 1½ in diam., in fruit 2½ in.; branches hairy. *Calyx* $\frac{1}{12}$ in., green. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., white. *Drupe* $\frac{1}{8}$ in., obovoid, smooth, purple.

30. **P. esculenta,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 80; leaves short-petioled obovate or elliptic acuminate sharply serrate, corymbs compact nearly glabrous, calyx minutely 5-toothed, corolla $\frac{1}{8}$ in. *Wall. Cat.* 1761; *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 261.

ASSAM (without name of collector). CHITTAGONG; fide *Roxburgh.*—Cultivated in the Calcutta Botanic Garden.

A branching shrub, 6–8 ft., trunk hardly any. *Leaves* 6½ by 3 in., base entire cuneate suddenly narrowed sometimes very shortly cordate, mature glabrate, nerves 5 pair; petiole ¼ in., obscurely puberulous. *Corymb* 2½ in. diam., short-peduncled, globose, many-fld., bracts $\frac{1}{16}$ in., linear. *Calyx* $\frac{1}{16}$ in., cup-shaped, obscurely puberulous; somewhat enlarged, more distinctly toothed, in fruit. *Corolla* yellowish-white, 2-lipped, throat hairy. *Drupe* $\frac{1}{8}$ in., globose or somewhat obovoid, usually 3–4-seeded.—All the examples seen of this appear to be cultivated; and the native habitat is uncertain.

31. **P. amplectens,** *Wall. Cat.* 1762; leaves sessile narrowly obovate acuminate serrate, corymbs compact nearly glabrous, calyx minutely 5-toothed, corolla $\frac{1}{8}$ in. *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 262. P. angustata, *Wall. Cat.* 1763.—Clerodendron n. 33, *Herb. H.f. & T.*

RANGOON; *Wallich, M'Lelland.* PEGU, MARTABAN and UPPER TENASSERIM, common, *Kurz.*

An undershrub (*Kurz*), throwing up flower-shoots 1–2 ft. high after the jungle fires. *Leaves* whitened underneath; sessile cordate, or petiole sometimes $\frac{1}{12}$ in. (Kurz).—This agrees so closely with *P. esculenta* except in the want of petioles, that it may be the wild state of it. *P. angustata,* Wall., is the same, the leaves being 10 by 4 in.

32. **P. macrophylla,** *Wall. Cat.* 1765; leaves sessile elongate-obovate remotely shallowly toothed, corymbs compact patently softly pubescent, calyx 5-toothed enlarged in fruit. *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 262.

PROME HILLS; *Wallich.* MARTABAN and PEGU; common (*Kurz*).

A low undershrub, sending up flower-shoots 1–2 ft. after the jungle fires; all the young parts softly pubescent. *Leaves* 12 by 4 in., base attenuate cuneate, whitened beneath, mature glabrous. *Corymbs* 2 in. diam., dense, softly hairy even in fruit; bracts ¼ in., narrowly lanceolate, hairy, persistent. *Calyx* in fruit $\frac{1}{8}$ in., deeply 2-lipped, striate. *Drupe* $\frac{1}{8}$ in., tubercular-rugose (in the dried state), usually 2-seeded (*Kurz*).—Perhaps a var. of *P. amplectens,* of which the drupe when dried appears nearly smooth (as in *P. esculenta*).

33. **P. procumbens,** *Moon*; *Wall. Cat.* 1780; leaves cordate-oblong acute serrate mature glabrescent, corymbs small subsessile globose pubescent, calyx shortly 5-toothed. *Schauer in DC. Prodr.* xi. 636.

CEYLON, fide *Wallich*; not uncommon in the hotter parts of the island, *Thwaites.*

Branches minutely strigose-pubescent. *Leaves* 3½ by 1¼ in., base abrupt or cordate, sparsely pubescent above when young, nerves 5 pair; petiole $\frac{1}{3}$ in. *Corymbs* 1 in. diam.; in fruit 1½–2 in., pyramidal or subthyrsoid. *Calyx* $\frac{1}{12}$ in., minutely pubescent or scabrid. *Corolla* $\frac{1}{8}$ in. *Drupe* $\frac{1}{8}$ in., obovoid, tuberculate.—All the specimens seen are from the Calcutta Botanic Garden, cultivated.

34. **P. herbacea,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 80; stem hardly any, leaves sessile obovate coarsely serrate mature pubescent on the nerves, corymbs small, calyx subequally 5-toothed. *Schauer in DC. Prodr.* xi. 637; *Griff. Itin. Notes*, p. 96, n. 1422, and *Ic.* t. 447, *lower fig.*; *Brand. For. Fl.* 368. P. pygmæa, *Wall. Cat.* 1776.

SUBTROPICAL HIMALAYA, alt. 500–3000 ft., from Kumaon to Bhotan, frequent in the Terai, *Wallich*, &c. S. DECCAN PENINSULA; Mudumallay, *Beddome.*

A small undershrub; flowering branches 1–4 in., springing up after the jungle fires. *Leaves* 4 by 2–3 in., obtuse, mature microscopically dotted above, minutely deciduously pubescent beneath, nerves 5 pair. *Corymbs* 1½ in. diam., pubescent, somewhat dense; peduncle 0–1½ in. *Calyx* $\frac{1}{10}$ in., closely pubescent; lobes ovate, obtuse. *Corolla* ⅛ in., greenish-white, hairy in the throat, 4-lobed obscurely 2-lipped. *Drupe* ¼ in. diam., globose.

IMPERFECTLY KNOWN SPECIES.

35. P. GROSSA, *Wall. Cat.* 1764, *type sheet*; leaves short-petioled narrowly obovate or elliptic coarsely obtusely toothed mature glabrate, petiole stellately fulvous-tomentose. *Schauer in DC. Prodr.* xi. 638, *partly.*—Burma; Pingee, *Wallich.*

Wallich's example is a branch with leaves only, in habit exceedingly like *P. esculenta*, except as to the points mentioned in the diagnosis. *Leaves* 5½ by 2 in., mature glabrate. Schauer's description appears compounded out of Wallich's two sheets of 1764, the second of which may very possibly not be of the same genus or order.

VAR.? *orbiculata*; leaves suborbicular base shortly cuneate coarsely toothed soft with simple hairs on both surfaces. P. grossa, *Wall. Cat.* 1764, second sheet only.—Prome; *Wallich.*

PREMNA ROXBURGHIANA, *Wall. Cat.* 2648, is not in the Wallichian Herbarium.
PREMNA? *Wall. Cat.* 9077, is Viburnum sambucinum, Reinw.

XII. GMELINA, *Linn.*

Trees or shrubs, shoots tomentose, unarmed or spinous. *Leaves* opposite, entire toothed or lobed. *Cymes* panicled or small; bracts narrow, except in *G. Hystrix*. *Flowers* large, yellow or brownish, tomentose at least when young. *Calyx* campanulate, shortly 5-toothed or subentire. *Corolla-tube* slender below, ventricose upwards; limb oblique, 5- (or 4-) lobed. *Stamens* 4, didynamous, subexserted; anther-cells oblong, pendulous, subseparate. *Ovary* 4-celled, 4-ovuled; style slender, shortly bifid. *Drupe* succulent; endocarp bony, undivided, 4–2-celled; calyx persistent, unaltered. *Seeds* oblong.—Species 8, E. Asiatic and N. Australian.

1. **G. arborea,** *Linn.*; *Roxb. Cor. Pl.* iii. 41, t. 246, and *Fl. Ind.* iii. 84; arboreous, leaves large cordate-ovate acute beneath and panicles fulvous-tomentose, bracts linear-lanceolate, corolla 1½ in. *Wall. Cat.* 1817; *Schauer in DC. Prodr.* xi. 680; *Dalz. & Gibs. Bomb. Fl.* 201; *Wight Ic.* t. 1470; *Griff. Notul.* iv. 179, and *Ic. Pl. Asiat.* t. 443; *Bocq. Rev. Verben.* t. 14, fig. 1–11; *Bedd. Fl. Sylv.* t. 253; *Brand. For. Fl.* 364; *Kurz For. Fl.* ii. 264; Gamble Indian Timbers, 295. G. Rheedii, *Hook. Bot. Mag.* t. 4395; *Thwaites Enum.* 244. Premna arborea, *Roth Nov. Sp.* 287. P. tomentosa, *Miq. in Pl. Hohenack.* n. 554, *not Willd.*—*Rheede Hort. Mal.* i. t. 41.

Throughout the DECCAN PENINSULA and CEYLON, frequent, extending to the foot of the N.W. HIMALAYA. CHITTAGONG.—DISTRIB. Malayan and Philippine Islands.

An unarmed tree, sometimes attaining 60 ft., deciduous, flowering with the young leaves. *Leaves* 9 by 6 in., more or less acuminate, entire, mature glabrate above, stellately hairy beneath; petiole 3 in., top glandular. *Panicles* often 1 foot, terminal; bracts ⅓ in.; flowers numerous. *Calyx* ⅙ in., teeth very small or obsolete. *Corolla* brown-yellow, upper lip shortly bifid, longer than the lower. *Drupe* ¾ in., ovoid, usually 2–1-seeded.

VAR. *glaucescens*; leaves glaucous beneath mature often nearly glabrous, calyx-teeth larger triangular.—Subtropical Himalaya and Khasia Mts., alt. 0-2000 ft.; *J. D. H.*, &c. Burma and Tenasserim, *Kurz.*—Probably only the form of *G. arborea* from moist places; some N.W. Himalayan examples are intermediate between it and the type.

2. **G. villosa,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 86; arboreous, leaves ovate or elliptic mature beneath and small racemose cymes fulvous-tomentose, bracts broadly lanceolate acuminate, corolla 1½ in. *Jack in Malay Misc.* i. 17, and in *Hook. Bot. Misc.* i. 284; *Wall. Cat.* 1816; *Schauer in DC. Prodr.* xi. 679. G. asiatica, *Wall. Cat.* 1818, *partly*; *Kurz For. Fl.* ii. 265, *not of Linn.*—Gmelina sp. n. 2, *Griff. Notul.* iv. 179. *Rumph. Herb. Amb.* ii. t. 39.

PENANG; *Wallich.* MALACCA; *Griffith, Maingay.* SINGAPORE; *G. Thomson.* NICOBARS; *Kurz.*—DISTRIB. Malaya.

Spinous (Roxburgh); branchlets unarmed. *Leaves* 3 by 2 in., obtuse or cuneate at both ends, subentire or coarsely toothed, mature glabrate above; petiole ⅜ in. *Racemes* terminal, 1–2 in.; bracts ½ in. *Calyx* ⅛–⅙ in., tomentose with several large glabrous glands; teeth small. *Corolla* yellow; tube very narrow below; upper lip of the limb larger than the lower, subentire. *Drupe* ¾ in., ovoid or obovoid, 2–1-seeded.

3. **G. asiatica,** *Linn.*; *Roxb. Fl. Ind.* iii. 87; shrubby, leaves small ovate or obovate entire or lobed mature glabrous, racemes terminal fulvous-tomentose, bracts small caducous, corolla 1½ in. *Lamk. Ill.* t. 542; *Wall. Cat.* 1818, *partly*; *Schauer in DC. Prodr.* xi. 679; *Wight Ill.* t. 174; *Bedd. For. Man.* 172; *Brand. For. Fl.* 365. G. coromandeliana, *Burm. Fl. Ind.* 132. G. lobata, *Gaertn. Fruct.* i. 268, t. 56, *excl. syn. Rumph.* G. parvifolia, *Roxb. Cor. Pl.* ii. 32, t. 162; *Wall. Cat* 2654; *Schauer l. c.* G. parviflora, *Roxb. l. c.* G. inermis, *Blanco Fl. Filip.* 493. Michelia spinosa, *Amman. in Act. Petrop.* viii. 218, t. 18.

DECCAN PENINSULA and CEYLON, frequent; *Roxburgh*, &c.—BENGAL; cultivated.

Spinescent, or unarmed. *Leaves* ½–1½ in., entire or coarsely lobed, mature beneath glabrous glaucescent from a close coat of minute round glands; petiole ¼ in. *Racemes* 1–2 in.; bracts ⅛ in. *Calyx* ⅛ in., tomentose, but with large bare glands, as in *G. villosa*, as is the corolla. *Drupe* also as of *G. villosa*, with which this species has been confounded by Kurz and others.

4. **G. Hystrix,** *Kurz in Journ. As. Soc.* 1870, ii. 81, and *For. Fl.* ii. 265; leaves elliptic cuneate or rhomboid at both ends mature glabrous, cymes subcapitate, bracts very large nervose coloured, corolla 2 in. *Benth. in Gen. Pl.* ii. 1154. G. Finlaysoniana, *Wall. Cat.* 6317.

TENASSERIM; fide *Kurz.*—DISTRIB Siam, Philippines.

A large, spinous, scandent shrub. *Leaves* 3 by 1½ in., entire, beneath glaucous with scattered round glands; petiole 1 in. *Cymes* 2 in.; bracts 1¼ by 1 in., ovate, 5-nerved. *Corolla* yellow, much as of *G. villosa*, but less tomentose without; dried exceeding 2 in., 1 in. (Kurz). *Drupe* ½ in., obovoid, 2-seeded.

5. **G. oblongifolia,** *Roxb. Fl. Ind.* iii. 83; arboreous, leaves ovate or oblong entire somewhat rough, panicles terminal brachiate brown-farinose, bracts small caducous, corolla large rosy. *Schauer in DC. Prodr.* xi. 679.

E. BENGAL (*Roxburgh*).

A tall timber tree. *Leaves* 6–12 by 3–8 in.; petiole 2 in., with several glands close to the apex. *Calyx* cyathiform, entire, farinose, a few glands on the outside. *Corolla-tube* short; limb 5-partite, lower lip longer with a deep yellow mark in the centre of its base. *Anthers* bipartite. *Drupe* oblong, somewhat 4-cornered and

obtuse, size of a large olive, smooth, ripe bright crimson, 1-celled; endocarp clavate, 4-cornered, 4-celled, perforated from the base up the centre. *Seed* solitary, lanceolate.—The foregoing is extracted from Roxburgh, and indicates a remarkable tree that no one else has seen. There is at Kew an unpublished drawing of Roxburgh's of this tree, agreeing exactly with the description.

EXCLUDED SPECIES.

G. SPECIOSISSIMA, *Don Prodr.* 104, *Schauer in DC. Prodr.* xi. 680, is Wightia gigantea, *Wall.*

XIII. **VITEX,** *Linn.*

Trees or shrubs; shoots hairy or tomentose. *Leaves* opposite, digitately 3–5-foliolate (in *V. simplicifolia* 1-foliolate). *Inflorescence* terminal and axillary, or wholly axillary; cymes peduncled or sessile, forming large or small panicles or corymbs; bracts small or longer than the calyx. *Calyx* campanulate, truncate or shortly 5-toothed (in *V. gamosepala* 3-toothed). *Corolla* small, tubular; limb 2-lipped, 5-toothed; central lobe of the lower lip usually much larger than the others. *Stamens* 4, didynamous, usually exserted; anther-cells at first parallel pendulous, afterwards divaricate, often twisting so that their lower ends are suberect. *Ovary* 2–4-celled, 4-ovuled; style filiform, shortly bifid. *Drupe* globose or obovoid, supported by the more or less enlarged calyx; endocarp bony 4-, or by suppression 3–1-celled. *Seeds* obovate or oblong.—Species 60; in all tropical and warm temperate regions.

Subgenus 1. **Euagnus,** *Schauer. Calyx* cup-shaped, shortly subequally 5-toothed or truncate.

* *Panicles terminal, penultimate axillary peduncles often added.*

1. **V. trifolia,** *Linn. f. Suppl.* 293; leaves simple and 3-foliolate, leaflets sessile obovate or obovate-oblong entire glabrate above beneath and panicles closely white-tomentose, corolla $\frac{1}{3}$–$\frac{1}{2}$ in., drupe $\frac{1}{4}$ in. diam. black. *Roxb. Fl. Ind.* iii. 69; *Wall. Cat.* 1743; *Bot. Mag.* t. 2187; *Schauer in DC. Prodr.* xi. 683; *Bedd. For. Man.* 172; *Brand. For. Fl.* 370. V. ovata, *Thunb. Fl. Jap.* 257; *Hook. & Arn. Bot. Beech. Voy.* 206, t. 47. V. repens, *Blanco Fl. Filip.* 513. V. incisa, *Wall. Cat.* 1746 *partly, not of Lamk.* V. Agnus castus, var. *Kurz For. Fl.* ii. 269.—*Rumph. Herb. Amb.* iv. t. 18. *Rheede Hort. Mal.* ii. t. 11.

Scattered throughout INDIA, in the tropical and subtropical region, from the foot of the Himalaya to CEYLON and Malacca, nowhere common.—DISTRIB. S.E. Asia to Japan, the Philippines and N. Australia.

A shrub or small tree. *Leaflets* 1–3 in., subobtuse, tomentum beneath of matted scarcely stellate hairs, so close as with difficulty to be scraped off; petiole 1 in. *Panicles* 1–4 in., oblong, often leafy at the base; bracts minute. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in., minutely 5-toothed. *Corolla* tomentose, lavender to blue. *Filaments* hairy at the base.—Perhaps commoner than supposed, being frequently unnoticed from its close general resemblance to the universal *V. Negundo.*

2. **V. Negundo,** *Linn.*; *Roxb. Fl. Ind.* iii. 70; leaves 3–5-foliolate, leaflets petioluled lanceolate entire or crenate glabrate above beneath and panicles closely white-tomentose, corolla $\frac{1}{4}$–$\frac{1}{3}$ in., drupe $\frac{1}{8}$ in. diam. black. *Wall. Cat.* 1744; *Schauer in DC. Prodr.* xi. 684; *Wight Ic.* t. 519; *Bedd. For. Man.* 171; *Brand. For. Fl.* 369; *Kurz For. Fl.* ii. 269; *Boiss. Fl. Orient.* iv. 535. V. bicolor, *Willd. Enum. Hort. Berol.* 660; *Schauer l. c.* 683; *Dalz. & Gibs. Bomb. Fl.* 201. V. arborea, *Desf. Cat. Hort. Paris.* 391.

V. paniculata, *Lamk. Dict.* ii. 612; *Roxb. l. c.* 71.—*Rumph. Herb. Amb.* iv. t. 19. *Rheede Hort. Mal.* ii. t. 12.

Throughout INDIA and CEYLON, in the warmer zone a universal plant. NICOBARS; *Kurz.*—DISTRIB. Cabul, E. Asia to the Philippines.

A shrub or small tree, hardly distinguishable from *V. trifolia* but by the points mentioned in the diagnosis. The leaflets are frequently 5, the centre one at least usually distinctly petioluled, the flowers rather smaller.

VAR. *incisa*; leaflets crenate-serrate or subpinnatifid. V. incisa, *Lamk. Dict.* ii. 611, and *Ill.* t. 541, fig. 2; *Bot. Mag.* t. 364; *Roxb. l. c.* 72; *Wall. Cat.* 1746, *partly*; *Schauer l. c.* 684.—Throughout India. Distrib. E. Asia.—The extreme pinnatifid form of this var. is Chinese; the wild Indian examples are crenate-serrate, i.e. intermediate.

3. **V. altissima,** *Linn. f. Suppl.* 294; leaves 3-foliolate, leaflets subsessile lanceolate subentire mature glabrate above thinly pubescent beneath, panicles compound fulvous-villous, corolla scarcely $\frac{1}{4}$ in., drupe $\frac{1}{3}$ in. diam. *Roxb. Fl. Ind.* iii. 71; *Wall. Cat.* 1755; *Schauer in DC. Prodr.* xi. 685; *Dalz. & Gibs. Bomb. Fl.* 201; *Wight Ic.* t. 1466; *Bedd. Fl. Sylv.* t. 252; *Brand. For. Fl.* 370.

DECCAN PENINSULA, especially the west side, up to 4000 ft., common; *Heyne, Wight*, &c.

A very large tree; shoots tawny-villous or woolly. *Leaves* 3-foliolate, occasionally 5-foliolate (Beddome); leaflets $5\frac{1}{2}$ by $1\frac{3}{4}$ in., mature glabrous above except the midrib, beneath closely distinctly reticulate and with scattered round yellow glands; petiole $2\frac{1}{2}$ in., sometimes somewhat winged upwards. *Panicles* 3–8 in. diam.; branches elongate, interrupted, cymes clustered; bracts $\frac{1}{12}$–$\frac{1}{8}$ in., elliptic. *Calyx* $\frac{1}{8}$ in., fulvous-villous, teeth short, triangular. *Corolla* woolly. *Ovary* and young fruit fulvous-villous at the apex.

VAR. *zeylanica*; mature leaves glabrate beneath. V. zeylanica, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 223. V. altissima (forma subglabra), *Thwaites Enum.* 244.—Ceylon; *Walker, Thwaites.*—Leaves beneath reticulate, the depressions microscopically tomentose, as in *V. altissima* after all the hair is rubbed off.

4. **V. alata,** *Heyne; Roth Nov. Sp.* 316; leaves 3-foliolate, leaflets subsessile broadly lanceolate subentire mature glabrate above thinly pubescent beneath, wing of the petiole broad cordate at base, panicles terminal compound fulvous-villous, corolla scarcely $\frac{1}{4}$ in., drupe $\frac{1}{3}$ in. diam. *Dalz. & Gibs. Bomb. Fl.* 201, *not of Schauer, nor of Kurz.* V. appendiculata, *Rottler in Herb. Wall.*—*Rheede Hort. Mal.* v. t. 1.

MADRAS; *Van Royen*; Tuichecoonum, *Rottler.* MYSORE; *Cleghorn.*

Scarcely differs from *V. altissima* but by the wing of the petiole, which is $\frac{1}{3}$–$\frac{2}{3}$ in. wide, continuous, dilated, cordate and subamplexicaul at the base; leaflets $2\frac{1}{2}$ in. wide. —Some branches, apparently of this, collected by Shuter, Law, and Stocks, have some of the leaves 5-foliolate.

5. **V. limonifolia,** *Wall. Cat.* 1754; leaves 3-foliolate, leaflets sessile ovate entire mature pubescent beneath, petiole broadly winged, panicles long-branched, cymes clustered distant, bracts prominent persistent. *Kurz For. Fl.* ii. 271. V. alata, *Schauer in DC. Prodr.* xi. 685, *not of Heyne.*

PEGU and TENASSERIM; *Wallich*, &c.—DISTRIB. Ava, Siam.

A tree; shoots fulvous-hairy or woolly. *Leaflets* 7 by $2\frac{3}{4}$ in., acute at both ends, mature nearly glabrate above, minutely densely fulvous-pubescent beneath; petiole 3–4 by $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* 18 by 6 in., fulvous-hairy; branches interruptedly spicate; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate, often imbricate. *Calyx* $\frac{1}{8}$ in., very shortly toothed, closely fulvous-strigillose. *Corolla* $\frac{1}{4}$ in., fulvous-villous. *Drupe* $\frac{1}{4}$ in. diam., globose, smooth. —The leaves are exceedingly like those of *V. pubescens*, except that the petiole is winged; the elongated interrupted panicle-branches are quite different.

6. **V. pubescens,** *Vahl Symb.* iii. 85; leaves 3–4-foliolate, leaflets sessile ovate or oblong entire pubescent, corymbs dense fulvous-tomentose, bracts ovate persistent prominent, corolla $\frac{1}{3}$–$\frac{1}{2}$ in., drupe $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Schauer in DC. Prodr.* xi. 686; *Blume Bijd.* 812; *Decne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 401; *Bedd. For. Man.* 171; *Kurz For. Fl.* ii. 271. V. arborea, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 73; *Jack in Mal. Misc.* i. 18, and in *Hook. Bot. Misc.* i. 285; *Wall. Cat.* 1747; *Wight Ic.* t. 1465. V. inæquifolia, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 223. Pistacia Vitex, *Linn. Fl. Zeyl.* 195. Wallrothia articulata, *Roth Nov. Sp.* 317.

S. DECCAN PENINSULA and CEYLON, frequent. E. BENGAL and MALAY PENINSULA, from the Khasia Terai, *H. f. & T.*, to Singapore; frequent from Pegu southwards.—DISTRIB. Throughout Malaya.

A tree, 30–50 ft. *Leaves* 3-foliolate, one or two smaller leaflets occasionally added; leaflets attaining 8 by 3 in., cuneate or scarcely acuminate, base cuneate rhomboid or of the lateral leaflets unequal rounded on one side, minutely pubescent on both surfaces, more strongly on the nerves; petiole 2–3 in., not winged. *Corymbs* 3–5 in. diam., depressed-pyramidal; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* $\frac{1}{6}$ in., densely fulvous-tomentose. *Corolla* tomentose, blue, upper lip ochroleucous. *Drupe* glabrous at the apex.

7. **V. diversifolia,** *Kurz Andam. Rep. App.* A 45 *and* B 14; leaves simple and 3-foliolate glabrate, leaflets sessile oblong cuneate at both ends entire, panicles terminal fulvous-strigose, bracts ovate prominent, corolla $\frac{1}{3}$ in.

ANDAMAN ISLANDS; *Kurz.*

Branchlets and shoots fulvous-strigose, or subtomentose. *Leaflets* attaining 5 by $1\frac{3}{4}$ in., above with minute thinly-scattered white glands, beneath finely reticulated, microscopically white-tomentose in the depressions, obscurely puberulous on the midrib; nerves 6–8 pair; petiole $1\frac{1}{2}$ in. *Panicles* 2–3 in., upper leaves graduating into bracts; upper bracts $\frac{1}{4}$ in. *Calyx* $\frac{1}{8}$ in., campanulate, subtruncate, fulvous-strigose. *Corolla* fulvous-villous, subtomentose. *Drupe* not seen.

8. **V. heterophylla,** *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 75; leaves 5-foliolate glabrate, leaflets petioluled elliptic or oblong much acuminate entire, panicles compound thinly cinereous-tomentose branches elongate, calyx $\frac{1}{10}$ in. cup-shaped, corolla tomentose. *Wall. Pl. As. Rar.* iii. 15, t. 226, and *Cat.* 1745; *Schauer in DC. Prodr.* xi. 686, *partly.*

ASSAM; *Jenkins.* E. BENGAL; Tipperah (*Roxburgh*).

A large tree, *Wallich.* Upper *leaves* generally 5-foliolate; leaflets 7 by $2\frac{1}{2}$ in., with scattered white glands above and yellow glands beneath, petiolule of the central leaflet usually $\frac{1}{4}$–$\frac{1}{2}$ in.; petiole 2 in., glabrate. *Panicles* 8 by 6 in., cymes dense-fld., clustered along the branches; bracts $\frac{1}{8}$ in., linear, deciduous. *Calyx* truncate. *Corolla* $\frac{1}{4}$ in., ochroleucous, lower lip blue. *Drupe* scarcely $\frac{1}{8}$ in. diam., glabrous at the apex.

VAR. *undulata*; leaves smaller all the upper 3-foliolate, leaflets shining undulate. V. undulata, *Wall. Cat.* 1756. V. heterophylla, *Kurz For. Fl.* ii. 270. Stereosperma n. 7, *Herb. H. f. & T.*—Pegu; *M'Lelland.* Rangoon; *Wallich.* Tenasserim; *Helfer* (Kew Distrib. n. 6068). Distrib. Java.—*Branchlets* sharply quadrangular. *Drupes* small.

9. **V. urceolata,** *Clarke*; leaves 3-foliolate glabrate, leaflets petioluled obovate shortly suddenly acuminate entire, panicles compound thinly cinereous-tomentose branches elongate, calyx $\frac{1}{8}$–$\frac{1}{6}$ in. oblong or suburceolate, corolla tomentose. V. heterophylla, *Schauer in DC. Prodr.* xi. 686, *partly.* V. Loureirii, *Herb. Wight, not of Hook. & Arn.* Vitex n. 12, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6064), *Maingay* (Kew Distrib. nn. 1205, 1207).—DISTRIB. S. E. Asia, Malaya.

A medium-sized tree (Maingay). *Leaves* (all the upper) 3-foliolate, a small leaflet rarely added; leaflets 5 by 2¼ in., obtuse, tip usually less than ¼ in., with scattered white glands above and yellow beneath, petiolule of the middle leaflet often ½ in.; petiole 1–2 in., not winged. *Panicles* 8 by 5 in., terminal, penultimate sometimes added; cymes densely flowered clustered along the branches; bracts ⅛ in., linear, deciduous. *Calyx* minutely toothed at flower-time, much enlarged, ½ in. diam., roundly 5-lobed in fruit. *Corolla* ¼–⅓ in. *Drupe* ⅓–½ in., apiculate.—This species differs from all the preceding by (inter alia) the large drupe. The inflorescence, calyx, corolla and drupe are so like those of *V. sumatrana* (Miq. Fl. Ind. Bat. Suppl. 567), that it may be a var. of it; but in *V. sumatrana* the leaves are mostly 5-foliolate and pubescent beneath.

10. **V. coriacea,** *Clarke*; leaves 3-foliolate coriaceous glabrous, leaflets petioluled oblong entire, panicles terminal fulvous-pubescent, flowers clustered on the elongate branches, calyx $\frac{1}{10}$ in. 5-toothed. Vitex n. 13, *Herb. Ind. Or. H.f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6065), *Maingay* (Kew Distrib. n. 1203).

Branchlets round, tips puberulous. *Leaflets* 4 by 1¾ in., obtuse or acute, beneath minutely glandular and with thick elevated nerves, petiolule of the central leaflet ¼–⅓ in., petiole 1–2 in., not winged. *Panicles* 6 by 3 in., strict, branches elongate ascending; bracts ⅙ in., oblong, fulvous-pubescent, deciduous; cymes condensed almost to clusters. *Calyx* fulvous-pubescent, wide funnel-shaped, in flower conspicuously 5-toothed; in fruit enlarged, cup-shaped, subtruncate. *Corolla* ¼ in., fulvous-pubescent, as are the pistil and filaments. *Drupe* ½ by ¼ in., teretely ellipsoid, very smooth.

11. **V. canescens,** *Kurz in Journ. As. Soc.* 1873, ii. 101, and *For. Fl.* ii. 270; leaves 3-foliolate, leaflets petioluled ovate or elliptic entire young fulvous-villous, panicles compound fulvous-pubescent branches elongate pedicels whorled.

ASSAM; *Griffith* (Kew Distrib. n. 6066), *Masters*. PEGU; *M'Lelland, Kurz*.—DISTRIB. Ava.

A tree, 20–30 ft., or a shrub (Griffith); innovations fulvous- or dusky-pubescent. *Leaves* (upper alone seen) 3-foliolate, or (Kurz) 5-foliolate; leaflets 4½ by 2 in., mature scabrid or glabrate fulvous-pubescent on the nerves; petiolule of the middle leaflet ⅓ in.; petiole 2 in., fulvous-pubescent, not winged. *Panicles* 12 by 6 in., with numerous elongate spreading branches; bracts very small, deciduous; pedicels $\frac{1}{12}$–⅙ in. *Calyx* $\frac{1}{10}$ in., pubescent, very shortly toothed. *Corolla* ¼ in., fulvous-tomentose. *Drupe* ¼–⅓ in. diam., globose, smooth.—Vitex canescens, *Wall. Cat.* 1757, is not in Wallich's Herbarium; Kurz does not state whether he intended or guessed his own *V. canescens* to be the same as Wallich's or no.

12. **V. Wimberleyi,** *Kurz For. Fl.* ii. 271; leaves 5–3-foliolate glabrous, leaflets petioluled elliptically oblong or lanceolate coarsely crenate-serrate, panicles terminal and penultimate puberulous.

ANDAMAN ISLANDS; *Kurz*.

A small evergreen tree, much resembling *V. sumatrana*. *Petioles* 2–3 in., slender, glabrous. *Flowers* small, clustered or cymulose; bracts caducous, lower leaf-like, upper linear-oblong as long as the calyces. *Calyx* ⅛ in., subtruncate, velvety. *Corolla* pubescent; tube wide, short; lobes obtuse, lowest much produced.—Not seen; the foregoing is copied from Kurz. Imperfect specimens of a plant collected by me in the Chittagong Hills show similar coarsely crenate-serrate leaflets, but have the petioles winged; it may be the young state of this species.

13. **V. simplicifolia,** *Clarke*; leaves 1-foliolate coriaceous glabrous, leaflet lanceolate entire, panicles terminal branches elongate, calyx ⅛–⅙ in. fulvous-hairy pedicelled. Vitex nn. 14 and 11, *Herb. Ind. Or. H.f. & T.*

MALACCA; *Griffith.*—DISTRIB. Borneo.

A small tree; branchlets round, puberulous or glabrate. *Leaflet* 7½ by 2¼ in., punctulate beneath, sessile, articulate on a petiole ½ in. *Panicle* a foot, one branch 15 by 1½ in. in Griffith's example, rusty-pubescent; cymes distant; bracts small, caducous; pedicels 12–16 in., thickened in fruit. *Calyx* shortly but distinctly toothed, enlarged in fruit. *Corolla* nearly ½ in., tomentose, ochroleucous, the middle lobe of the lower lip purple-lilac (Griffith). *Drupe* ½ in. or more, ovoid; apex depressed. —Wight supposed this to be *Vitex macrophylla*, R. Br. (now removed to *Gmelina* by Bentham); and it is so very like it, except in having narrow leaves, that it appears unnatural to refer the two plants to different genera.

** *Peduncles all axillary, sometimes subobsolete.*

14. **V. vestita,** *Wall. Cat.* 1750; leaves 3-foliolate, leaflets petioluled ovate-lanceolate entire mature softly pubescent beneath, cymes axillary mostly shorter than the petioles. *Schauer in DC. Prodr.* xi. 692; *Kurz For. Fl.* ii. 272. V. Finlaysoniana, *Wall. Cat.* 6314.

PENANG; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 6063), *Cuming.*—DISTRIB. Ava, Sumatra, Java, Borneo.

A tree; shoots softly hairy or almost woolly. *Leaflets* 6 by 2¾ in., acuminate at both ends; petiolule of the middle leaflet often ¾ in.; petiole 2–3 in., not winged. *Cymes* sessile, small, few-fld., fulvous-pubescent; bracts ⅛ in., linear; pedicels 0–⅛ in. *Calyx* ⅛ in, subtruncate, fulvous-pubescent. *Corolla* ⅓ in.; tube narrow, glabrate, densely yellow-glandular; lobes small. *Anther-cells* not very unequal, divaricate. *Drupe* ¼ in. diam.; fruit-calyx saucer-shaped.

15. **V. peduncularis,** *Wall. Cat.* 1753; leaves 3-foliolate, leaflets petioluled lanceolate entire mature glabrate, panicles long-peduncled elongate many-fld. cinereous-farinose. *Schauer in DC. Prodr.* xi. 687.

From ASSAM and BENGAL to TENASSERIM, frequent; *Roxburgh, Wallich,* &c.

A tree, 20–40 ft.; shoots cinereous-pubescent. *Leaflets* 4½ by 1 in., acuminate, mature densely covered by minute yellow glands beneath, midrid sometimes puberulous; petiolule of the middle leaflet ⅛–⅓ in.; petiole 2–4 in., slender or sometimes slightly winged. *Peduncles* 3–4 in., from the penultimate axils; panicles often 6–8 by 2 in., open; bracts $\frac{1}{12}$ in., linear. *Calyx* $\frac{1}{10}$ in., grey-pubescent, subtruncate. *Corolla* ⅓ in., grey-pubescent. *Drupe* ⅓ in. diam., cuboid-globose.

VAR. *Roxburghiana*; less grey-pubescent, petioles winged, panicles lax few-fld. V. alata, *Roxb. Fl. Ind.* iii. 72; *Wall. Cat.* 1752; *Kurz For. Fl.* ii 272, *not of Heyne nor of Schauer.*—Behar, at Parasnath, *Edgeworth.* E. Bengal and Khasia Terai; *H.f. & T.* Pegu; *Kurz.*—Roxburgh quotes (for his Chittagong V. alata) *Rheede Hort. Mal.* v. t. 1, which has leaves that might do, but a totally different inflorescence, and is Heyne's *V. alata.*

16. **V. leucoxylon,** *Linn. f. Suppl.* 293; leaves 5-foliolate, leaflets petioluled oblong entire mature woolly along the midrib beneath otherwise glabrate, corymbs divaricate lax, drupe ¾ in. *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 74; *Wall. Cat.* 1748; *Schauer in DC. Prodr.* xi. 692, *partly*; *Dalz. & Gibs. Bomb. Fl.* 201; *Bedd. For. Man.* 171; *Brand. For. Fl.* 370 *partly, not of Kurz.* V. saligna, *Roxb. Fl. Ind.* iii. 75; *Wall. Cat.* 6313; *Schauer l. c.* Vitex n. 18, *Herb. Ind. Or. H. f. & T.* Wallrothia leucoxylon, *Roth Nov. Sp.* 319; *Wight Ic.* t. 1467.—*Rheede Hort. Mal.* iv. t. 36.

S. DECCAN PENINSULA and CEYLON, up to 3000 ft., *Roxburgh, Rottler,* &c.

A small tree. *Leaflets* 5 by 1 in., obtuse or obtusely acuminate, when young sparsely hairy, mature with patent yellowish hairs along each side of the midrib beneath; petiolules ¼–¾ in.; petiole 1–3 in., not winged. *Corymbs* nearly glabrous; bracts ⅛ in., lanceolate, scarious, marcescent; flowers sessile in each dichotomy. *Calyx*

¼ in., minutely toothed, tomentose or nearly glabrous. *Corolla* ⅓ in., woolly without. *Drupe* obovoid, succulent.—In the typical form the leaflets are coriaceous, shining, yellowish beneath, nervation obscure: in *V. saligna*, Roxb., they are more membranous, the reticulated nervation distinct on both surfaces. A very handsome form with broader leaflets is marked *Wallrothia tomentosa* by Wight; but the extreme membranous narrow-leaved *V. saligna* (Roxburgh's specimen) shows similar hair on each side the midrib beneath.

17. **V. glabrata,** *Br. Prodr.* 512; leaves 5–3-foliolate, leaflets ovate or oblong subentire mature sparsely strigillose beneath, corymbs divaricate, drupe ⅓–½ in. *Schauer in DC. Prodr.* xi. 695; *Benth. Fl. Austral.* v. 68. V. Cunninghamii, *Schauer l. c.* 690. V. leucoxylon, *Schauer l. c.* 692, *partly*; *Blume Bijd.* 813; *Kurz For. Fl.* ii. 273; *Gamble Indian Timbers*, 298. V. bombacifolia, *Wall. Cat.* 1749; *Walp. Rep.* iv. 86. V. pallida, *Wall. Cat.* 1751.—Vitex nn. 10 and 18, *Herb. Ind. Or. H. f. & T.*

From S. ASSAM and CACHAR to MALACCA, frequent.—DISTRIB. Siam, Cochin China, Malaya. N. Australia.

A small tree; shoots fulvous-tomentose or woolly. *Leaves* mostly 5-foliolate (in the Indian tree); leaflets 5 by 2¼ in., acute or cuneate at both ends, entire rarely toothed, young very softly hairy or subtomentose, mature with scattered appressed minute hairs beneath; petiolules ¼–⅜ in.; petiole 1–4 in., not winged. *Peduncles* long or more often short; flowers somewhat numerous, mostly shortly pedicelled; bracts inconspicuous. *Calyx* $\frac{1}{10}$ in., minutely toothed. *Corolla* ⅓–½ in., tomentose, ochroleucous; lowest segment much the largest, hairy, blue-purple. *Filaments* minutely hairy. *Pistil* glabrous. *Drupe* obovoid, succulent.—The typical *V. glabrata*, R. Br., has leaves usually 3-foliolate and rounder more glabrate leaflets and fewer-fld. corymbs than the Indian tree; but some of the examples of *V. Cunninghamii* appear identical with Silhet specimens. The typical *V. bombacifolia*, Wallich (Vitex n. 18, Herb. Ind. Or. H. f. & T.), has the leaflets mostly 5, large and broad; *V. pallida*, Wallich (Vitex n. 10, Herb. Ind. Or. H. f. & T.), has smaller, more hairy leaflets, and short peduncles.

Subgenus 2. **Glossocalyx.** Calyx unequally 2-lipped, deeply 3-toothed.

18. **V. gamosepala,** *Griff Notul.* iv. 178, and *Ic. Pl. Asiat.* t. 448, fig. 2; leaves 3-foliolate, leaflets petioluled ovate or lanceolate entire glabrate except the nerves beneath, cymes axillary sessile short. *Benth. in Gen. Pl.* ii. 1154.—Vitex nn. 15, 16, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6065), *Maingay* (Kew Distrib. n. 1202).

A middle-sized tree; shoots fulvous-hairy. *Leaflets* 4 by 1¾ in., somewhat coriaceous, petiolule of the middle leaflet ¼ in.; petiole 1–2 in., not winged. *Cymes* 1–3 in. diam., globose, repeatedly 2–3-tomous, sparingly fulvous-hairy; bracts caducous. *Calyx* ⅛ in.; tube shorter than the lip, ovoid; upper lip of two oblong segments, lower twice as long, elliptic, entire. *Corolla* nearly ½ in.; tube narrow, glabrate, with many yellow glands, limb small. *Anther-cells* divaricate as in *Vitex* type (Griffith's drawing shows them very young). *Drupe* ⅙ in., ovoid, glabrous.—The corolla as well as the inflorescence shows the affinity to *V. vestita.*

UNKNOWN SPECIES.

VITEX? AXILLARIS, *Wall. Cat.* 1760, from Tavoy, is not in Wallich's Herbarium.

VITEX HAYNGA, *Roxb. Hort. Beng.* 46, from Chittagong (name only), is probably one of the species described in Fl. Ind., under which Roxburgh has omitted to record the earlier name.

VITEX SCABRA, *Wall. Cat.* 1758, from Ava (Schauer in DC. Prodr. xi. 695), is represented by a branchlet and leaves only in Wallich's Herbarium.

XIV. **CLERODENDRON,** *Linn.*

Trees or shrubs, sometimes rambling. *Leaves* opposite, rarely 3–4-nate, simple, occasionally lobed. *Cymes* axillary or in terminal panicles, often leafy below; bracts prominent or small. *Calyx* campanulate, truncate or 5-toothed, or sub-5-partite, persistent often accrescent or coloured. *Corolla-tube* slender, cylindric, usually long filiform; limb 5-fid, spreading, more or less oblique. *Stamens* 4; anthers long-exserted, cells parallel. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, shortly bifid. *Drupe* globose, succulent, more rarely nearly dry, 4-grooved, separating into 4 pyrenes of which 1–3 are often suppressed. *Seeds* oblong.—Species 70, in the warmer regions of both Hemispheres, chiefly in the Eastern.

Clerodendron aculeatum, Linn. (under Volkameria), a native of America, is cultivated in Indian gardens; it is allied to *C. inerme*, but has axillary spines. *C. fragrans*, Vent., a Chinese species, is extensively cultivated, particularly the double-flowered variety; it is allied to *C. bracteatum*. *C. canescens*, Wall., also Chinese, and closely allied to the last, is occasionally cultivated.

Subgenus 1. **Euclerodendron.** Corolla-tube less than 1½ in.

* *Peduncles mainly axillary, or panicle lax leafy below.*

1. **C. inerme,** *Gaertn. Fruct.* i. 271, t. 57, fig. 1; leaves obovate or elliptic subobtuse entire glabrate, calyx ⅛–⅙ in. minutely toothed, in fruit somewhat enlarged subtruncate closely embracing the base of the obovoid drupe. *Roxb. Fl. Ind.* iii. 58; *Wall. Cat.* 1788, *chiefly*. *Schauer in DC. Prodr.* xi. 660; *Dalz. & Gibs. Bomb. Fl.* 200; *Bedd. For. Man.* 174; *Brand. For. Fl.* 363; *Kurz For. Fl.* ii. 266. Volkameria, *Linn. Fl. Zeyl.* 231.—*Rheede Hort. Mal.* v. t. 49.

INDIA and CEYLON near the sea, from Bombay to Tenasserim.

A straggling shrub, 3–7 ft.; shoots grey-pubescent. *Leaves* opposite, rarely ternate, ¾–1½ in., young somewhat grey-pubescent, base cuneate; petiole ⅛ in. *Peduncles* ½–1½ in., all axillary, 3–7-fld.; bracts 1/30 in., linear; pedicels ⅛–⅙ in. *Calyx* grey-puberulous or glabrate. *Corolla* white; tube ¾ in., glabrate; lobes ⅕ in., oblong. *Drupe* ½ by ⅓ in., spongy, hardly succulent, smooth hardly sulcate, separating into 4 woody pyrenes.

2. **C. neriifolium,** *Wall. Cat.* 1789; leaves elliptic acute or linear-oblong entire glabrate, calyx ⅙ in. shortly toothed, in fruit enlarged subpatent striate distinctly toothed or lobed. *Schauer in DC. Prodr.* xi. 660. C. inerme, *Benth. Fl. Hongk.* 271, and *Fl. Austral.* v. 61; *Schauer l. c., in great part*; *Wall. Cat.* 1788, *type sheet*. C. inerme *var.* neriifolia, *Kurz For. Fl.* ii. 266. Volkameria neriifolia, *Roxb. Fl. Ind.* iii. 64.—*Rumph. Herb. Amb.* v. t. 46 (drupe very immature).

MALAY PENINSULA near the sea, from Chittagong to Malacca, frequent.—DISTRIB. Malaya, China, Australia, Polynesia.

Leaves mostly ternate, 3½ by 1¼ in.; or, in the extreme type form of Roxburgh, sublinear, 4¼ by ⅓ in. *Cymes* and drupe rather larger than in *C. inerme*. *Calyx* often ½ in. diam. in fruit.—Otherwise as *C. inerme*, of which this may be a var., as Bentham and Kurz have treated it.

VAR. *macrocarpa*, Wall. ms.; drupe 1¼ by ¾ in.—Martaban; *Wallich*. Rangoon; *M'Lelland*.

3. **C. disparifolium,** *Blume Bijd.* 809; leaves oblong or elliptic acuminate subentire glabrate, calyx ¼ in. deeply 5-lobed nearly glabrous. *Schauer in DC. Prodr.* xi. 672; *Hassk. Retzia*, i. 57. C. acuminatum, *Wall.*

Cat. 1792; *Schauer l. c.* 664. C. Jackianum, *Wall. Cat.* 1794, and in *Bot. Mag.* t. 3049, *in note*; *Schauer l. c.*

MALACCA and SINGAPORE, frequent; *Wallich, Griffith*, &c.—DISTRIB. Throughout Malaya.

A shrub; branchlets puberulous. *Leaves* opposite, unequal or equal, 4 by 1¾ in., base obtuse, undulate or obscurely toothed, young scarcely pubescent; petiole 1–2 in. *Peduncles* numerous, axillary, or penultimate forming a terminal panicle; bracts ¼ in., linear; cymes 10–20-fld., puberulous; pedicels ¼–½ in. *Calyx* divided nearly to the base, often purplish, minutely puberulous; segments broad-lanceolate acuminate. *Corolla* pale yellow (Blume); tube nearly 1 in., glabrous; lobes ⅓ in., narrowly obovate. *Drupe* ¼ in. diam., globose, succulent; calyx-lobes in fruit ⅓ in., pendent. —Wallich's specimens exactly agree with those from Java; but the one species has been made into two because Blume describes the panicle as terminal, which Schauer regarded as axillary.

4. **C. Griffithianum,** *Clarke*; leaves oblong acuminate minutely toothed pubescent beneath at least on the midrib, inflorescence subterminal very lax, calyx ⅓–½ in. deeply 5-lobed.

ASSAM; *Griffith* (Kew Distrib. n. 6054).—DISTRIB. Ava.

A small tree (Griffith); in habit resembling *C. disparifolium*, but the branches viscous-pubescent. *Leaves* 6 by 1½ in., base rounded or cuneate, mature glabrate above, pubescent (usually minutely) on the lamina beneath; petiole 1 in., viscidly pubescent. *Peduncles* penultimate from petioled leaf-like bracts, and running into completely terminal panicles; bracts ½ in., filiform; cymes lax, viscidly pubescent; pedicels ⅛–⅓ in. *Calyx* minutely pubescent; tube short, distinctly campanulate; lobes lanceolate, acuminate, more or less reddish. *Corolla* glabrate, white (*Griffith*); tube 1 in.; lobes ⅓ in., oblong. *Drupe* ½ by ⅓ in., ovoid; calyx-tube much enlarged, almost enclosing the drupe; segments ⅓ in., triangular, thickened, erect, overtopping the drupe.

5. **C. Lobbii,** *Clarke*; leaves ovate entire minutely pubescent beneath, peduncles axillary long, calyx ½ in. deeply lobed.

PENANG; *Lobb.*

Apparently a rambling shrub; branchlets minutely pubescent. *Leaves* 3 by 2¼ in., obtuse, base rounded, glabrate above; petiole probably short. *Peduncles* numerous, 3–4 in.; bracts ⅙ in., linear; cymes minutely grey-pubescent, 12-fld.; pedicels ¼–⅓ in. *Calyx* obovoid, minutely grey-pubescent, enclosing the corolla, with scattered round glands; segments ¼ in., ovate-triangular, valvate in bud. *Corolla* (not fully expanded) glabrate, probably ⅔ in. long, altogether of *Clerodendron*, as are the stamens and pistil.

6. **C. phlomoides,** *Linn. f. Suppl.* 292; leaves ovate sinuate or serrate mature puberulous or pubescent beneath, calyx lobed half-way down lobes triangular caudate-acuminate. *Roxb. Fl. Ind.* iii. 57; *Wall. Cat.* 1787; *Schauer in DC. Prodr.* xi. 663; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1473; *Bedd. For. Man.* 174; *Brand. For. Fl.* 363. Volkameria multiflora, *Burm. Fl. Ind.* 137, t. 45, fig. 1.

From the N.W. HIMALAYA TERAI to Ceylon, general in the drier climates, extending to BEHAR and ORISSA (not to Bengal).

A large bush, sometimes 30 ft.; shoots pubescent. *Leaves* 1¾ by 1¼ in., obtuse or acute, often sub-rhomboid, usually sinuate-crenate sometimes entire, rarely crenate-dentate; petiole ⅝ in., pubescent. *Peduncles* 1 in., axillary, or panicle sometimes truly terminal; cymes 12-fld., lax, pubescent; bracts ⅜ in., obovate-lanceolate; pedicels ⅙–½ in. *Calyx* ⅙–½ in., puberulous; in fruit slightly enlarged, more rigid, glabrescent. *Corolla* puberulous, white; tube nearly 1 in., filiform; segments ⅓ in., elliptic. *Drupe* ⅙–¼ in., obovoid, slightly succulent, separating into 4 pyrenes much as in *C. inerme.*

7. **C. calamitosum,** *Linn. Mant.* 90; leaves broadly elliptic coarsely toothed mature nearly glabrous, calyx lobed nearly to the base lobes narrowly oblong cuneately acute. *Schauer in DC. Prodr.* xi. 663; *Bot. Mag.* t. 5294. Volkameria alternifolia, *Burm. Fl. Ind.* 137, t. 44.

MALACCA; *Maingay.*—DISTRIB. Java.

A shrub; branches minutely pubescent. *Leaves* 4 by 2 in., opposite rarely alternate, obtuse, base rhomboid; petiole 1 in. *Peduncles* axillary and in a terminal panicle, puberulous; bracts $\frac{1}{8}$ in., linear; cymes 6-fld.; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. *Calyx* exceeding $\frac{1}{3}$ in., minutely pubescent. *Corolla* puberulous, white; tube 1 in.; lobes $\frac{1}{3}$–$\frac{1}{2}$ in., narrowly obovoid. *Drupe* not seen.—Appears closely allied to *C. phlomoides.*

** *Panicles terminal, elongate, lax, often pendulous.*

8. **C. nutans,** *Wall. in Bot. Mag.* t. 3049, and *Cat.* 1793; glabrous, leaves short-petioled narrowly obvate or lanceolate subentire, calyx divided nearly to the broad base segments ovate-lanceolate. *Don Prodr.* 103; *Schauer in DC. Prodr.* xi. 663; *Griff. Itin. Notes,* 24, n. 375; *Kurz For. Fl.* ii. 268.

From SIKKIM and ASSAM to CHITTAGONG, alt. 0–3000 ft.; *Wallich,* &c.—DISTRIB. Ava.

A shrub, commonly 6 ft. *Leaves* 8 by $1\frac{1}{2}$ in., or 6 by 2 in., much acuminate, base attenuate, entire or occasionally slightly toothed; petiole $\frac{1}{3}$ in. *Panicles* 3–12 by 2–3 in., very lax, few-fld., brachiate; bracts $\frac{1}{4}$ in., filiform; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* $\frac{1}{3}$ in.; in fruit stellate red, more or less enlarged, in one example $1\frac{3}{4}$ in. diam. *Corolla* white; tube $\frac{1}{2}$ in.; lobes $\frac{1}{3}$ in., obovate. *Drupe* $\frac{1}{2}$ in. diam., succulent, dark-purple, pyrenes 1–4.

9. **C. penduliflorum,** *Wall. Cat.* 1795, and in *Bot. Mag.* t. 3049, *in note*; leaves distinctly petioled lanceolate or oblong acuminate subentire mature glabrate, panicle minutely pubescent, calyx divided nearly to the base segments oblong cuneately acute minutely pubescent. *Schauer in DC. Prodr.* xi. 664.

MALAY PENINSULA, from Akyab, *Kurz,* to Tenasserim, *Helfer* (Kew Distrib. n. 6047). NICOBAR ISLES.

A shrub, resembling *C. nutans* except as to the calyx. *Leaves* from 8 by 1 in. to 5 by $2\frac{1}{4}$ in., or sometimes 9 by 4 in.; base cuneate or frequently obtuse, usually entire, sometimes distinctly toothed. *Panicle* puberulous in the typical form, but (as the corolla) very nearly glabrous in some Moulmein examples. *Calyx* $\frac{1}{4}$ to $\frac{1}{3}$ in., segments scarcely wider at the base. *Drupe* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., globose, succulent, pyrenes 4; sepals in fruit slightly enlarged, reflexed, reddish.

10. **C. macrostachyum,** *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 220; leaves long-petioled cordate-ovate toothed sparsely pubescent, calyx very small subtruncate. Clerodendron n. 34, *Herb. Ind. Or. H.f. & T.*—Verbenacea, *Wall. Cat.* 6316.

KHASIA MTS., alt. 2000 ft.; on limestone rocks above Chela, *Wallich, H.f. & T.*; Upper Kala Pani, alt. 5000 ft., *Clarke.* MOULMEIN; on limestone rocks, *Parish, Lobb.*

A membranous herb. *Leaves* attaining 9 by $6\frac{1}{2}$ in., subacute, deeply cordate, very membranous, whitened beneath; petiole $6\frac{1}{2}$ in. *Panicles* 5–12 in., terminal, sometimes compound, branches long, narrow, many-fld., pubescent somewhat glandular or glabrate; bracts $\frac{1}{6}$ in., ovate, or smaller oblong; pedicels slender, $\frac{1}{2}$ in. *Calyx* $\frac{1}{16}$–$\frac{1}{12}$ in., cup-shaped, limb shallowly toothed, glabrate or obscurely pubescent or with red glands; unaltered or slightly inflated in fruit. *Corolla* glabrous, delicate, pale blue (Hooker); tube $\frac{1}{3}$ in., linear; lobes $\frac{1}{8}$ in., obovate. *Stamens* long-exserted. *Ovary* 2- (imperfectly 4-) celled, 4-ovuled, with large red glands, style subterminal. *Drupe* $\frac{1}{10}$ in., obovoid, nearly dry, covered with red glands, dividing into 4 pyrenes.—Not allied to any other

Clerodendron. The Moulmein material has smaller, less toothed, leaves, and has more pubescence and glands than the Chela plants.

*** *Panicles terminal, elongate, conspicuously bracteate; calyx subtruncate.*

11. **C. serratum,** *Spreng. Syst.* ii. 758; shrubby, leaves subsessile oblong or elliptic acuminate serrate, pedicels densely pubescent. *Don Prodr.* 103; *Wall. Cat.* 1809; *Ham. in Trans. Linn. Soc.* xvii. 187; *Schauer in DC. Prodr.* xi. 664; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1472; *Brand. For. Fl.* 364; *Kurz For. Fl.* ii. 267. C. ternifolium, *Don Prodr.* 103. C. macrophyllum, *Bot. Mag.* t. 2536; *Reich. Fl. Exot.* t. 209; *Schauer l. c.* 674. C. ornatum, *Wall. Cat.* 1811; *Schauer l. c.* 675. C. herbaceum, *Wall. Cat.* 1815; *Schauer l. c.* 675. C. cuneatum, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 221. Volkameria serrata, *Linn. Mant.* 90; *Roxb. Fl. Ind.* iii. 62. V. herbacea, *Roxb. Hort. Beng.* 46.

From the HIMALAYA, east of the Sutlej, to CEYLON and TENASSERIM, alt. 0–4000 ft., frequent; very common in Bengal.

Stems usually 2–8 ft., simple, hardly woody, being burnt annually in the jungle fires; when more than a year old becoming branched, more or less hairy or glabrate. *Leaves* usually some of them ternate, commonly 6 by 2 in., narrowly obovate-oblong or subelliptic, base cuneate, mature glabrate puberulous pubescent or (in some S. Indian examples) closely villous on the lamina beneath; petiole 0–¼ in. *Panicle* 6 by 1 in., sublinear, or 10 by 5 in. subpyramidal, pubescent often villous, branches and pedicels patently shortly hairy; bracts ½–1½ in., from obovate to lanceolate, pubescent, subpersistent, often coloured; pedicels 0–¼ in. *Calyx* ⅕ in., cup-shaped, pubescent or puberulous, limb very shortly 5-lobed, slightly enlarged in fruit. *Corolla* nearly glabrous without, hairy at the base of the stamens, from purplish-blue and white to nearly white; tube ⅓–½ in., narrow-cylindric; mouth oblique, 2-lipped; lobes ⅓–½ in., oblong or elliptic. *Drupe* ½ by ⅙–⅓ in., succulent, purple-black, 4–1-pyrened. —In the form *C. herbaceum*, Wall., the panicle is cylindric dense subspicate; in *C. ornatum*, Wall. (only seen from Pegu), the panicle is diffuse, slender, unusually glabrous.

VAR. *Wallichii*; leaves large often shortly petioled, panicle large pyramidal open pubescent, bracteoles prominent lanceolate, calyx truncate or very nearly so. C. farinosum, *Wall. Cat.* 1810 (*not* Volkameria farinosa, *Roxb.*). C. divaricatum, *Jack in Mal. Misc.* i. 2, and in *Hook. Bot. Misc.* ii. 89; *Schauer l. c.* 674. C. javanicum, *Walp. Rep.* iv. 113.—Eastern India; from Sikkim and Assam to Malacca, common. Distrib. Sumatra, Java, Cambodia.—The upper leaves (at least) in some examples of this are quite entire.

12. **C. venosum,** *Wall. Cat.* 1807; arboreous, leaves opposite petioled elliptic acuminate glabrescent, panicle often farinose-tomentose. Volkameria farinosa, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 64, *not* C. farinosum, *Wall.* —Volkameriæ sp., *Griff. Itin. Notes*, 70, n. 1082. Clerodendron n. 30, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4000 ft.; Mamloo, *Griffith* (Kew Distrib. n. 6052); Cherra, *H. f. & T.*, &c.

A tree (Roxburgh), 40 ft., with well-marked trunk (Clarke). *Leaves* (none ternate) 7 by 3 in., base attenuate; petiole ½–1 in. (or uppermost leaves sessile). *Panicle* 8 by 5 in., brachiate, branches divaricate; rachis acutely quadrangular; bracts 1–2 in., ovate, acuminate, leaf-like; bracteoles ½ in., linear-oblong, persistent, farinose-tomentose without spreading hairs; pedicels secund. *Calyx* ⅓ in., truncate, glabrescent. *Corolla* nearly as of *C. serrata*, but with a greenish-white tinge. *Drupe* nearly as of *C. serrata*.

**** *Panicles peduncled, of* 1 *or more heads, axillary or sometimes pseudo-terminal.*

13. **C. deflexum,** *Wall. Pl. As. Rar.* iii. 10, t. 215, and *Cat.* 1808; leaves elliptic or oblong acuminate subentire mature softly pubescent beneath, bracts narrow, a few leaf-like often added. *Schauer in DC. Prodr.* xi. 665.

PENANG; *Wallich.* MALACCA and SINGAPORE; *Griffith,* &c.

A shrub, 4 ft. (Wallich); branches pubescent. *Leaves* opposite, 13 by 4 in., base cuneate or rounded, mature glabrate above; petiole 1 in. *Peduncles* 1–5 in., axillary, or sometimes one pseudo-terminal lateral deflexed, with 1 rarely 3 heads. *Panicles* 1–3 in. diam., pubescent, red. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., divided more than half-way down; lobes lanceolate, suberect, scarcely acuminate, sparingly pubescent. *Corolla* slightly pubescent, white suffused rose-purple; tube $\frac{3}{4}$ in.; lobes $\frac{1}{4}$ in., elliptic. *Drupe* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., succulent, purple.—Hardly any of Schauer's section of *axilliflorœ* have the inflorescence so exclusively axillary as this, which he places in a section defined as having a terminal panicle.

14. **C. bracteatum,** *Wall. Cat.* 1800; leaves ovate acuminate entire mature villous, bracts numerous ovate or oblong. *Walp. Rep.* iv. 106; *Schauer in DC. Prodr.* xi. 665.—Clerodendron, *Griff. Itin. Notes,* 34, n. 563.

SIKKIM and BHOTAN, alt. 2–5000 ft., frequent. MISHMEE; *Griffith.* ASSAM, CACHAR and KHASIA MTS. up to 4000 ft., *Wallich, H. f. & T.,* &c.

A shrub, 8 ft., or arborescent 20 ft.; branches fulvous-villous. *Leaves* opposite, 6 by 3–4 in., base from cordate to cuneate, mature softly hairy above, villous or almost woolly beneath; petiole 1–3 in. *Inflorescence* fulvous-villous; peduncles 3 in., bearing 1 rarely 3 heads; bracts $\frac{2}{3}$ by $\frac{1}{3}$ in., prominent. *Calyx* $\frac{1}{2}$ in., divided more than half-way down; segments ovate-lanceolate, suberect. *Corolla* pubescent, white; tube 1 in.; lobes $\frac{1}{4}$ in., elliptic. *Drupe* $\frac{1}{3}$ in., purple; calyx enlarged, reddish; segments subpatent.

***** *Leaves beneath glabrate, with many round glands; petioles connected by a dense ring of hairs; panicle terminal, large, open.*

15. **C. paniculatum,** *Linn. Mant.* 90; leaves cordate-ovate 5–3-lobed, calyx $\frac{1}{6}$–$\frac{1}{5}$ in. divided nearly to the base, segments narrowly oblong. *Vahl Symb.* ii. 74; *Bot. Reg.* t. 406; *Reichb. Fl. Exot.* t. 208; *Schauer in DC. Prodr.* xi. 668. C. pyramidale, *Andr. Bot. Rep.* t. 628; *Wall. Cat.* 1802. C. splendidum, *Wall. Cat.* 1803. Volkameria angulata, *Lour. Fl. Cochinch.* 389.

PENANG; *Wallich.* MERGUI and MALACCA; *Griffith.*—DISTRIB. Siam, Cochin-China, Java.

A shrub, 3–6 feet. *Leaves* 8 in. diam., lobed 1–3 in. deep, denticulate, above with scattered multicellular hairs or glabrate; petiole 1–4 in. *Panicle* 4–12 by 3–8 in., pubescent, often leafy below, very lax, the branches often prolonged subracemose, usually coloured red; bracteoles linear. *Corolla* pubescent or nearly glabrous, red orange or nearly white; tube $\frac{1}{2}$–$\frac{3}{4}$ in., filiform; lobes $\frac{1}{4}$–$\frac{1}{3}$ in. *Drupe* not seen.

VAR. *diversifolia*; upper leaves not lobed base cordate or hastate. V. diversifolia, *Vahl Symb.* ii. 75; *Schauer l. c.*—Moulmein; *Parish.*

16. **C. squamatum,** *Vahl Symb.* ii. 74; leaves cordate roundly ovate shortly acuminate denticulate, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. deeply divided segments broad lanceolate acute. *Wall. Cat.* 1798; *Bot. Reg.* t. 649; *Maund Bot.* t. 13; *Schauer in DC. Prodr.* xi. 669. C. dentatum, *Wall. Cat.* 1799; *Schauer l. c.* 674. Volkameria Kaempferi, *Jacq. Ic. Pl. Rar.* t. 500. V. dentata, *Roxb. Fl. Ind.* iii. 61.

SIKKIM, BHOTAN, ASSAM, KHASIA MTS. and SILHET, alt. 0–4000 ft.; *Wallich, H. f. & T.,* &c., frequent.—Widely cultivated.

A shrub, 2–5 ft.; glabrate, or the panicle and innovations minutely thinly hairy.

Leaves 6–15 in. diam., teeth usually scarcely ⅛ in. deep; petiole 2–4 in. *Panicle* often 18 by 12 in., open, red; bracts small. *Corolla* nearly glabrous, scarlet; tube ¾–1 in., filiform; lobes ⅓ in. *Drupe* ¼–½ in. diam., blue-black; fruiting calyx enlarged, patent 1½ in. diam.

VAR. *urticifolia*; teeth of the leaves ¼–⅓ in. deep patent all round the leaves. V. urticifolia, *Wall. Cat.* 1801; *Schauer l. c.* Volkameria urticifolia, *Roxb. Fl. Ind.* iii. 61.—Assam, E. Bengal, Pegu; *Wallich*, &c. Distrib. Ava.

***** *Panicles terminal, capitate or corymbose; leaves beneath not or very obscurely glandular.*

17. **C. lasiocephalum,** *Clarke*; leaves ovate acuminate dentate pubescent, panicle subcapitate, calyx-segments ⅔ in. linear-subulate.

MISHMEE; *Griffith* (Kew Distrib. n. 6055).

Branches pubescent upwards. *Leaves* opposite, 10 by ½ in., base cuneate or rounded, membranous, sparsely pubescent on both surfaces; petiole 2 in. *Panicle* sessile, 2–3 in. diam., dense, depressed-globose, pubescent; bracts linear. *Calyx* divided, nearly to the base; segments flaccid caudate, pubescent. *Corolla* not seen. *Drupe* ⅓ in. diam., red.

18. **C. Colebrookianum,** *Walp. Rep.* iv. 114; leaves shallowly cordate ovate acute entire mature subglabrate, panicle large spreading, flowers clustered, calyx ⅙–¼ in. *Schauer in DC. Prodr.* xi. 672; *Gamble Indian Timbers*, 299. C. glandulosum, *Wall. Cat.* 1806; *Lindl. in Bot. Reg.* 1844, 19, *in note*; *Schauer l. c.*

SIKKIM, ASSAM, and KHASIA MTS., alt. 1–4000 ft., frequent; *H. f. & T.*, &c. MOULMEIN; *Parish*. PROME HILLS; *Col. Benson*. SINGAPORE; *Lobb*.

A shrub, 4–8 ft. *Leaves* often 9 in. diam., young puberulous, beneath eglandular or with a few scattered large glands especially near the apex of the petiole; petiole 2–8 in. *Panicles* 1–2 ft. diam., straggling, pubescent; flowers very numerous in clusters; bracts lanceolate, caducous at flower-time. *Calyx* pubescent, often bearing a few large glands, divided hardly half-way down; teeth triangular or lanceolate. *Corolla* nearly glabrous, from rose-purple to white; tube 1 in.; lobes ¼ in., elliptic. *Drupe* ⅓ in. diam., blue, pyrenes usually 4; calyx in fruit ⅓–½ in. diam.—*C. glandulosum*, Wall., is a specimen from the Calc. Bot. Garden, with the leaves rather more pubescent, and the bracts persistent.

VAR. *denticulata*; leaves irregularly sinuate denticulate.—Jaintea Hills; Jowye, *Clarke*.

19. **C. infortunatum,** *Gaertn. Fruct.* i. 271, t. 57, fig. 1; leaves ovate acuminate entire or serrulate mature hairy, panicle open villous, corolla-tube exceeding the eglandular calyx-lobes ½ in. *Lamk. Ill.* t. 544; *Wall. Cat.* 1796; *Schauer in DC. Prodr.* xi. 667; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1471; *Bedd. For. Man.* 173, and *Anal. Pl.* xxii. fig. 1; *Brand. For. Fl.* 363; *Kurz For. Fl.* ii. 267. C. viscosum, *Vent. Jard. Malm.* t. 25; *Bot. Mag.* t. 1805; *Bot. Reg.* t. 629. C. cordatum, *Don Prodr.* 103; *Schauer l. c.* 674. C. castaneæfolium, *Klotzsch in Reis. Pr. Wald. Bot.* 102, t. 65. C. calycinum, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 222. Volkameria infortunata, *Roxb. Fl. Ind.* iii. 59.—Clerodendron, *Linn. Fl. Zeyl.* 232; *Burm. Thes. Zeyl.* 66; *Rumph. Herb. Amb.* iv. t. 49; *Rheede Hort. Mal.* ii. t. 25.

Throughout INDIA, from Gurwhal and Assam to CEYLON and Singapore, in the warm region; very common.—DISTRIB. Malaya.

A shrub, 4 ft., often gregarious, yellow- or white-villous upwards, sometimes a small tree according to a note in Herb. Wallich. *Leaves* 4–8 in., base cordate or obtuse, varying from round-ovate to broad-oblong, in the Deccan examples usually entire, in

the N. Indian denticulate, somewhat roughly hairy above, beneath densely villous or thinly hairy often with small obscure round glands; petiole 1–4 in. *Panicle* 6–12 by 4–8 in., erect, brachiate, sometimes leafy on the main rachis, upper branches and calyces more or less reddening; bracts of the cymes usually caducous. *Calyx*, in flower, ⅓ in., divided nearly to the base; segments broadly lanceolate, very acute, suberect. *Corolla* pubescent without, white pink-tinged; tube ⅔ in. *Drupe* ½ in. diam., black; calyx in fruit enlarged, sometimes 1½ in. diam.—Mountain specimens have often large leaves, and are unusually high-coloured. *Lindl. Bot. Reg.* 1844, t. 19, doubtfully referred here by Schauer, has high-red flowers, and may possibly be some garden form of *C. infortunatum*, which in the wild state produces a nearly white corolla.

20. **C. villosum,** *Blume Bijd.* 811 (*excl. syn. Rheede*); leaves cordate-ovate entire mature villous, panicle open silky hairy, corolla-tube about as long as the glandular calyx-lobes ¼ in. *Schauer in DC. Prodr.* xi. 667; *Kurz For. Fl.* ii. 268. C. molle, *Jack in Malay Misc.* i. 15, and in *Hook. Bot. Misc.* i. 283, *not of H. B. K.* C. velutinum, *Wall. Cat.* 1797. C. ferrugineum, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 221. C.? trichotomum, *Wall. Cat.* 6315, *letter* B, *not of Thunb.*

MALAY PENINSULA frequent; from Mergui (*Griffith*) to Singapore (*Sir R. Schomburgk*).—DISTRIB. Java.

A shrub 3–5 ft., or a small tree 15–20 ft. (Kurz). *Leaves* as of *C. infortunatum*, but slightly more silky rather than roughly villous. *Panicle* as of *C. infortunatum*, but more softly hairy, and not red. *Calyx* ⅓ in., divided rather more than half-way down. *Corolla* pubescent, greenish-white, altogether smaller than of *C. infortunatum*. *Drupe* ⅓ in diam., dry black appearing hardly succulent.—Very like *C. infortunatum*, but distinguished by its small flowers, and generally also by the glandular calyx-segments. But in a few examples of *C. infortunatum* from the Malay Peninsula the calyx is full of glands.

Subgenus 2. **Siphonanthus.** Corolla-tube more than 3 in., filiform.

21. **C. Siphonanthus,** *Br. in Ait. Hort. Kew. ed.* 2, iv. 65; glabrous, leaves 3–4-nate or opposite subsessile narrowly lanceolate subentire, panicle terminal elongate lax. *Wall. Cat.* 1784; *Wight Ill.* t. 173; *Schauer in DC Prodr.* xi. 670; *Brand. For. Fl.* 364. C. verticillatum, *Don Prodr.* 102; *Schauer l. c.* 671. Siphonanthus indica, *Willd. Sp. Pl.* i. 606; *Lamk. Ill.* t. 79, fig. 1; *Roxb. Fl. Ind.* iii. 67. S. angustifolia, *Willd. l. c.* Ovieda mitis, *Burm. Fl. Ind.* 136, t. 43, fig. 1, 2.

From SIKKIM and ASSAM to TENASSERIM, frequent. MTS. of S. DECCAN PENINSULA. KUMAON, wild, fide *Brandis.*—DISTRIB. Sumatra, extensively cultivated in both hemispheres.

A shrub, 4–8 ft., branches virgate. *Leaves* 6 by 1 in., shortly acuminate, base tapering, usually entire or sinuate, rarely remotely crenately lobed; petiole 0–⅙ in. *Panicle* 8–18 by 4–6 in, often leafy below; cymes very lax, few-fld.; bracts ½ in., linear or linear-lanceolate; pedicels ½–1½ in. *Calyx* ½ in., divided ¾ the way down; segments oblong, cuneately acute. *Corolla* glabrous, white; tube 3–4½ in.; lobes ⅔ in., obovate-oblong.

VAR. *semiserrata*; leaves opposite short-petioled elliptic crenate-lobate, panicle terminal 3–4-fld. C. semiserrata, *Wall. Cat.* 1785.—Prome and Segain; *Wallich.*—Apparently a much-branched shrub; but the specimens are possibly only short imperfect flower-branches rapidly developed from a normal plant of *C. Siphonanthus* cut to the base by a hot-weather jungle-fire; for the calyx and corolla are exactly as of *C. Siphonanthus.*

22. **C. hastatum,** *Lindl. in Bot. Reg.* t. 1307; pubescent or villous, leaves opposite hastate ovate or oblong often angular or sublobate, panicle

terminal densely corymbose. *Bot. Mag.* t. 3398; *Schauer in DC. Prodr.* xi. 671. C. sagittatum, *Wall. Cat.* 1786. Siphonanthus hastata, *Roxb. Fl. Ind.* iii. 67.

SILHET; *Wallich.* KHASIA MTS., alt. 0–3000 ft., *H.f. & T.*, &c.

A large shrub. *Leaves* 6 by 4 in., angular, toothed, or oblong and hardly angular; petiole 4 in. *Corymb* subsessile, 4–8 in. diam., pubescent, with reduced leaves often scattered; proper bracts $\frac{2}{3}$ in., linear. *Calyx* $\frac{1}{2}$ in., divided nearly to the base; segments oblong, shortly acute. *Corolla* pubescent, white; tube 4 in.; lobes $\frac{1}{2}$ in., elliptic. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., succulent, black-purple; calyx much enlarged in fruit, dark red.

DOUBTFUL OR EXCLUDED SPECIES.

C. COROMANDELIANUM, *Spreng. Syst.* ii. 758, *Schauer in DC. Prodr.* xi. 673, is another name for C. ovatum, *Poir. Suppl.* iv. 352; a species founded on a plant from Pondicherry, resembling *C. squamatum*, but with entire glabrous leaves and whiteish flowers.

C. BUCHANANI, *Roxb. Fl. Ind.* iii. 60 (under Volkameria), and *Ic. Ined. at Kew*, is a *Clerodendron* with terminal compact red panicle and ovate leaves from Amboina and Celebes. This was united by D. Don (Prodr. Nepal. 103) with his *Cl. fœtidum* from Nepal, a plant with axillary inflorescence, which Hamilton's original specimen in the British Museum shows to have been *Caryopteris grata*. Walpers (Rep. iv. 108) and Schauer (DC. Prodr. xi. 672) have copied; there is no reason to suppose that Roxburgh's *Buchanani* has ever been found in Nepal or in British India. C. Buchanani, *Wall. Cat.* 2653, is not in his Herbarium.

C. FORTUNATUM, *Linn.*, erroneously stated by Schauer (in DC. Prodr. xi. 671) to be an Indian species, is a Chinese plant. C. fortunatum, *Wall. Cat.* 2652, is not in his Herbarium.

C. SERICEUM, *Wall. Cat.* 1814, is *Hiptage sericea*, Hook. f.

XV. **HOLMSKIOLDIA,** *Retz.*

Shrubs. *Leaves* opposite. *Cymes* short, axillary or collected at the tips of the branches; bracts small. *Calyx* widely obconic, subtruncate, membranous, coloured. *Corolla* cylindric, curved; limb oblique; lobes 5, short. *Stamens* 4, didynamous; anthers exserted, ovate; cells parallel. *Ovary* obtuse or obscurely depressed, imperfectly (afterwards completely) 4-celled, 4-ovuled; ovules laterally attached; style terminal, shortly 2-fid. *Drupe* obovoid, included in the enlarged calyx, divaricately 4-lobed nearly half-way down, pyrenes 1–4. *Seeds* oblong.—Species 3, an Indian, Madagascarian, and Tropical African.

H. sanguinea, *Retz. Obs.* vi. 31, and in *Hoffm. Phyt. Blaett.* 35, t. 3; leaves petioled ovate acuminate base obtuse somewhat pubescent, cymes bright red. *Wall. Cat.* 2087; *Bot. Reg.* t. 692; *Benth. Lab.* 642; *Schauer in DC. Prodr.* xi. 696; *Reichb. Fl. Exot.* t. 149; *Decne. in Jacquem. Voy. Bot.* t. 140; *Bocq. Rev. Verben.* 135, t. 20, fig. 1–8; *Brand. For. Fl.* 370; *Kurz For. Fl.* ii. 257. H. rubra, *Pers. Syn.* ii. 144. Hastingia coccinea, *Smith Exot. Bot.* ii. 41, t. 80; *Roxb. Fl. Ind.* iii. 65. H. scandens, *Roxb. l. c.* Platunium rubrum, *Juss. in Ann. Mus. d'Hist. Nat.* vii. 76.

SUBTROPICAL HIMALAYA, alt. 0–4000 ft., from Kumaon to Bhotan, and the PROME HILLS, frequent.

A straggling shrub, 10–30 ft. *Leaves* 3 by 2 in., entire or toothed; petiole $\frac{1}{2}$ in. *Cymes* 1–2 in., puberulous, red becoming scarlet in fruit. *Corolla* 1 by $\frac{1}{6}$ in., brick-red or somewhat orange. *Stamens* glabrous. *Ovary* glandular; style glabrous. *Drupe* $\frac{1}{4}$–$\frac{1}{3}$ in.; fruiting calyx 1 in. diam.

XVI. CARYOPTERIS, *Bunge.*

Shrubs, erect or rambling. *Leaves* opposite, acuminate, toothed or subentire, minutely punctate with yellow glistening glands. *Cymes* small, dense, many-fld., axillary or running into a terminal thyrse; bracts small. *Calyx* deeply 5-fid; segments triangular or lanceolate, somewhat accrescent. *Corolla-tube* short, cylindric; limb spreading, middle lobe of the lower lip larger, crisped or (in the typical non-Indian species) fimbriate. *Stamens* 4, didynamous; anthers exserted, cells divaricate (in the Indian species), confluent. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, shortly 2-fid. *Capsule* small, globose, dividing into 4 concave valves with incurved margins holding the seeds. *Seeds* oblong, erect.—Species 5, two N.E. Asiatic and the following.

Though the genus is near Clerodendron, two of the Indian species are easily distinguished by their very short corolla: the third, C. Wallichiana, has the corolla-tube scarcely $\frac{1}{2}$ in. The capsule is hardly less succulent than in several species of Clerodendron, nor is the incurving of the edges of the valves different from what occurs in that genus.

1. **C. Wallichiana,** *Schauer in DC. Prodr.* xi. 625; leaves elliptic acuminate, cymes collected mostly in terminal thyrses, corolla $\frac{1}{3}$ in., calyx-segments in fruit lanceolate erect 1–3-ribbed. *Brand. For. Fl.* 370. Volkameria odorata, *Roxb. Hort. Beng.* 46. Clerodendron odoratum, *Don Prodr.* 102; *Wall. Cat.* 1812.—Volkameriæ sp., *Griff. Itin. Notes*, 128, n. 504.

SUBTROPICAL HIMALAYA, alt. 0–4500 ft., from the Punjab to Bhotan; frequent.

A spreading shrub, 4–12 ft.; shoots ashy-pubescent or subtomentose. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate, toothed or nearly entire, ashy-pubescent or puberulous; petiole $\frac{1}{3}$ in. *Cymes* mostly in terminal thyrses 3–5 by 1 in., ashy-pubescent, glandular. *Calyx* $\frac{1}{12}$ in., in fruit $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{3}$ in., pubescent, glandular; middle lobe of lower lip nearly $\frac{1}{3}$ in. blue, 4 other lobes about $\frac{1}{4}$ in., white. *Capsule* $\frac{1}{6}$–$\frac{1}{5}$ in. diam., globose, closely pubescent.

2. **C. grata,** *Benth. in Gen. Pl.* ii. 1158; leaves elliptic acuminate pubescent, cymes mostly axillary small corymbose, corolla $\frac{1}{5}$ in., calyx-segments in fruit subpatent triangular. Clerodendron gratum, *Wall. Cat.* 1813; *Schauer in DC. Prodr.* xi. 674, *not of Kurz.* C. fœtidum, *Don Prodr.* 103; *Schauer l. c.* 672, *not of Bunge.* Vitex sex-dentata, *Wall. Cat.* 1759; *Schauer l. c.* 696.

KUMAON; below Nynee Tal, alt. 4000 ft., *Thomson, Strachey & Winterbottom.* NEPAL; *Wallich.*

A rambling shrub; branches pubescent or tomentose. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in. (mostly smaller), base rhomboid or almost rounded, toothed or subentire, mature softly pubescent or almost villous beneath; petiole $\frac{1}{3}$ in. *Cymes* $\frac{1}{4}$–$\frac{3}{4}$ in., densely pubescent, 3–8-fld., dichotomous, without a common rachis. *Calyx* $\frac{1}{10}$ in., densely pubescent, in fruit $\frac{1}{6}$–$\frac{1}{8}$ in., membranous, not ribbed. *Corolla* pubescent, glandular. *Capsule* $\frac{1}{5}$ in. diam., globose, nearly glabrous, somewhat ribbed.

3. **C. paniculata,** *Clarke*; leaves elliptic acuminate mature glabrate, panicles axillary small dense many-fld., corolla $\frac{1}{5}$ in., calyx-segments in fruit small lanceolate. Clerodendron gratum, *Kurz For. Fl.* ii. 268, *not of Wall.*—Callicarpa n. 9, *Herb. Ind. Or. H.f. & T.*

SUBTROPICAL HIMALAYA, alt. 1–4000 ft., frequent; from E. Nepal, *J. D. H.*, to Mishmee, *Griffith* (Kew Distrib. n. 6044).—DISTRIB. Ava.

A spreading shrub; branches terete, slender, pubescent. *Leaves* mostly obtuse or rounded at the base. *Panicles* axillary, subsessile, $\frac{1}{2}$–$2\frac{1}{2}$ in., distinctly panicled, rachis

distinct, often 20–60-fld., pubescent or glabrate. *Corolla* pubescent, deep red. *Drupe* pubescent; calyx hardly accrescent.—Otherwise much resembling *C. grata*: the whole panicle usually is red; but in *C. grata* it is often more or less red.

XVII. GLOSSOCARYA, *Wall.*

Grey-tomentose, scandent shrubs. *Leaves* opposite, ovate, shortly petioled, entire. *Cymes* many-fld., in a dense terminal corymbose panicle; flowers sessile; bracts small. *Calyx* campanulate, 5-toothed, hardly accrescent. *Corolla-tube* narrow-cylindric; limb 2-lipped, 5-lobed. *Stamens* 4, didynamous; anthers long-exserted, ovate; cells parallel. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, 2-fid. *Capsule* oblong, somewhat widened upwards, exserted, 4-valved; valves narrowly obovoid, substipitate, margins inflexed holding the seed, one produced downwards as a 1-sided wing. *Seeds* narrowly oblong, erect.—Species 3, an Australian and the following.

1. **G. Linnæi,** *Benth. in Gen. Pl.* ii. 1158; leaves ovate or obovate subcordate mature glabrescent, capsule grey strigose. Clerodendron Linnæi, *Thwaites Enum.* 243.

CEYLON, in hot dry places; *Walker, Thwaites.*

Scandent; branches pubescent. *Leaves* 3¼ by 1½ in., apiculate; petiole ⅕ in. *Corymbs* 3 in. diam., grey-tomentose; bracts ⅓ in., elliptic, or some of the lower foliaceous. *Calyx* ⅛ in., or in fruit ⅙ in., limb shallowly roundly lobed. *Corolla* strigose, white; tube ⅓ in., slender; lobes ⅛–⅙ in. *Filaments* exserted 1 in. *Capsule* ¼–⅓ by ⅙ in.

2. **G. mollis,** *Wall. Cat.* 1741; leaves ovate mature softly pubescent beneath, capsule patently grey-hairy. *Griff. in Calc. Journ. Nat. Hist.* iii. 366; *Schauer in DC. Prodr.* xi. 626; *Kurz For. Fl.* ii. 257.

MOULMEIN; *Griffith* (Kew Distrib. n. 6017), *Lobb.*

Closely resembling *G. Linnæi*, but generally more hairy; branchlets and panicles densely softly grey-villous. *Capsule* rather longer, ⅓ in.

XVIII. HYMENOPYRAMIS, *Wall.*

A large, rambling shrub; branches grey-tomentose. *Leaves* opposite, ovate, entire. *Cymes* lax, in large, pyramidal, axillary or terminal panicles; flowers very small; bracts minute. *Calyx* minute, 4-fid; greatly accrescent in fruit, membranous, 4-winged, utricular. *Corolla-tube* cylindric; limb oblique, 4-fid. *Stamens* 4; anthers exserted, ovate; cells parallel. *Ovary* 2-celled, 4-ovuled; style filiform, shortly 2-fid. *Capsule* small, obovoid, included, 4-valvular; valves obovoid-oblong, margins inflexed holding the seed. *Seeds* pendulous, subtriquetous.

H. brachiata, *Wall. Cat.* 774; *Griff. in Calc. Journ. Nat. Hist.* iii. 365; *Schauer in DC. Prodr.* xi. 626; *Bocq. Rev. Verben.* 113, t. 11, fig. 1–10; *Kurz For. Fl.* ii. 258.

PEGU; *Wallich.*—DISTRIB. AVA.—In N. and Central India cultivated.

Leaves 3½ by ½ in., acuminate, base obtuse or rhomboid, mature glabrate above, grey-tomentose or pubescent beneath; petiole ⅓ in. *Panicles* 12 by 8 in., leafy below, grey-tomentose. *Calyx* 1/24 in. *Corolla* ⅛ in., pubescent, white. *Capsule* ⅛–⅙ in., fulvous-hirsute; utricle ⅓–½ in., ovoid, acutely 4-winged, mouth minute.

XIX. **PERONEMA,** *Jack.*

A lofty tree; branchlets grey-tomentose. *Leaves* opposite, unequally pinnate; leaflets several pair, entire. *Panicles* in the upper axils large, compound; bracts small; flowers very small. *Calyx* shortly 5-fid, not accrescent. *Corolla-tube* cylindric; limb 2-lipped, 5-lobed. *Stamens* 2; anthers subexserted, ovate; cells parallel, subseparate. *Ovary* 4-celled, 4-ovuled; style filiform, subentire. *Capsule* small, globose, longer than the calyx, 4-valved; valves quarter-spheres, margins inflexed holding the seeds. *Seeds* pendulous.

P. canescens, *Jack in Mal. Misc.* 2, vii. 46, and in *Hook. Comp. Bot. Mag.* i. 152; *Wall. Cat.* 9057; *Schauer in DC. Prodr.* xi. 627; *Wight Ic.* t. 1460; *Griff. Notul.* iv. 177. C. heterophyllum, *Miq. Fl. Ind. Bat. Suppl.* 570.

MALACCA; *Griffith* (Kew Distrib. n. 6015).—DISTRIB. Sumatra, Java, Borneo.

Leaves 1–2 ft., grey-tomentose or pubescent beneath; rachis winged, leaflets 9 by 2 in., sessile, acute; petiole 2–7 in. *Panicles* 1 foot, corymbose, pubescent. *Calyx* $\frac{1}{12}$ in., deeply toothed. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in., pubescent. *Capsule* $\frac{1}{10}$ in., hirsute.

XX. **SYMPHOREMA,** *Roxb.*

Scandent shrubs. *Leaves* opposite, entire or toothed. *Cymes* peduncled, capitate, 7-fld.; involucre of 6 oblong bracts, accrescent in fruit. *Calyx* obovoid, short 4–8-toothed, somewhat accrescent. *Corolla* small, white; tube cylindric; lobes 6–16, subequal, narrowly oblong. *Stamens* as many as the corolla-lobes; anthers exserted, ovate; cells parallel. *Ovary* 2-(imperfectly 4-) celled, 4-ovuled; style filiform, shortly bifid. *Fruit* nearly dry, included in the calyx, 1-seeded. *Seed* erect, cotyledons fleshy.—Species 3, a Philippine Island one and the following.

1. **S. involucratum,** *Roxb. Cor. Pl.* ii. 46, t. 186, and *Fl. Ind.* ii. 262; leaves ovate or elliptic pubescent or villous, corolla $\frac{1}{4}$ in. 6–8-lobed, involucre in fruit reticulate membranous. *Wight Ic.* t. 362; *Dalz. & Gibs. Bomb. Fl.* 199, *not of Wall. nor of Schauer.* Congea paniculata, *Wall. Cat.* 1739, *partly.*

W. DECCAN PENINSULA from the Concan southwards, frequent, and in CEYLON. BEHAR; Monghyr Hills, *Hamilton.*

Innovations stellately tomentose. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., subacute, usually toothed, ultimately nearly glabrous above; petiole $\frac{1}{3}$ in. *Peduncles* 1 in.; bracts in flower $\frac{1}{4}$ in., pubescent or villous; in fruit $1\frac{1}{4}$ by $\frac{1}{2}$ in., spathulate-elliptic, thinly pubescent. *Calyx* $\frac{1}{6}$ in., stellately tomentose; in fruit $\frac{1}{4}$ in., or more, narrower upwards. *Fruit* $\frac{1}{6}$ in., subglobose, nearly glabrous.—The leaves on the main branches are often large; the flowering branches often produce only small leaves $\frac{1}{3}$–$\frac{2}{3}$ in. The picture of Roxburgh shows the corolla decidedly too large, which misled Wallich, whom Schauer followed. Kurz (*For. Fl.* ii. 254) says this species is "common all over Ava, Martaban and Pegu," where no one else has found it: it might be suspected that Kurz had mistaken for it some *Sphenodesma,* but he describes the corolla as having 6–8 linear-lanceolate acute lobes, and the leaves as coarsely toothed.

2. **S. polyandrum,** *Wight Ic.* t. 363, and *Ill.* t. 173 *bis,* fig. 7; leaves ovate villous, corolla $\frac{1}{2}$ in. 14–18-lobed, involucre in fruit tomentose. C. involucratum, *Wall. Cat.* 1740; *Schauer in DC. Prodr.* xi. 621, *not of Roxb.* S. involucratum, *Kew Distrib.* n. 6007.

S. DECCAN PENINSULA in the hills; *Wight, Beddome,* &c., extending north to Belgaum.

Similar to *S. involucratum*, but larger in all its parts and more hairy. *Leaves* 4 by 2$\frac{3}{4}$ in., some on the main stem 8–9 by 4 in., stellately villous beneath. *Calyx* $\frac{1}{4}$ in. and upwards in flower. *Bracts* in fruit 1$\frac{1}{2}$ by $\frac{3}{4}$ in., obscurely membranous.

XXI. **SPHENODESMA,** *Jack.*

Scandent, mostly large, shrubs. *Leaves* opposite, entire, shortly petioled. *Cymes* capitate, 3- or 7-fld., with an involucre of 6 oblong or obovate bracts; panicled, i. e. the leaves at the base of the peduncles to the cymes more or less bract-like, mostly deciduous. *Calyx* funnel-shaped, 5- (rarely 4–6-) toothed, sometimes enlarged or inflated in fruit. *Corolla-tube* short, cylindric; lobes 5, rarely 6, ovate oblong or narrowly lanceolate. *Stamens* 5, included, rarely subexserted; anthers ovate. *Ovary* imperfectly 2-celled, 4-ovuled; ovules pendulous from the apex of the placentiferous axis; style filiform, shortly bifid, or (in subgenus *Brachynema*) very short or obsolete, stigma obscurely 2-lobed. *Drupe* globose or obovoid, small, included or subincluded in the calyx; 1- (or rarely 2-) seeded in the few (mostly imperfectly ripe) examples seen.—Species 9, some Bornean and those here described.

The cyme in this genus is dichotomous with a single flower in the fork; the two lateral branches are again dichotomous with a single flower in the fork; the cyme is thus 7-fld.; or, in 1 or 2 species, 3-fld. by the lateral flowers of the 2 cyme-branches being undeveloped. The flower in the principal fork is necessarily the oldest, and ebracteate: hence the bracts are always 6.

Sect. 1. **Brachynema,** *Griff.* (Genus). *Corolla-lobes* oblong, or narrowly lanceolate. *Anthers* included. *Style* obsolete or minute.

1. **S. microstylis,** *Clarke*; leaves ovate mature softly pubescent or villous beneath, corolla-lobes 5–6 narrowly lanceolate. Brachynema ferruginea, *Griff. Notul.* iv. 176. Symphorema microstylis, *Bedd. ms.*

MERGUI and MOULMEIN, *Griffith* (Kew Distrib. n. 6007, partly). TAVOY; *Parish.*—DISTRIB. Siam.

A shrub, 6–8 ft. (Parish); shoots and inflorescence rusty stellate-villous or subtomentose. *Leaves* 5$\frac{1}{2}$ by 3$\frac{1}{2}$ in., subacute, base obtuse, entire, mature pubescent above at least on the nerves; petiole $\frac{1}{2}$ in. *Peduncles* 1$\frac{1}{4}$ in.; heads 7-fld., rusty villous; bracts (at flower-time) $\frac{3}{4}$ by $\frac{1}{4}$ in., spathulate-elliptic, obtuse. *Calyx* in flower $\frac{1}{4}$ in. or more; teeth ovate. *Corolla-tube* $\frac{1}{3}$ in., narrowly funnel-shaped, densely hairy to the base within; lobes $\frac{1}{4}$-$\frac{1}{3}$ by $\frac{1}{20}$ in., puberulous, subtomentose. *Anthers* ovate, low in the corolla-tube. *Ovary* 4-ovuled; style minute. *Drupe* not seen.—Wight, Parish and Beddome have all referred this to *Symphorema* from the narrow corolla-lobes, but the short filaments will not suit. Supposing the state of the style to be due to dimorphism, the species is distinct and possibly indicates a new genus. It cannot be Kurz's *Symphorema involucratum*, which Kurz says has coarsely toothed leaves.

2. **S. paniculata,** *Clarke*; leaves ovate or elliptic mature pubescent beneath, corolla-lobes 5–6 oblong obtuse or narrowly obovoid. Congea paniculata, *Wall. Cat.* 1739.

DECCAN PENINSULA; Kurg, *Rottler*; Cochin, *Johnstone.*

A scandent shrub; shoots and inflorescence rusty stellately villous. *Leaves* 3$\frac{1}{2}$ by 1$\frac{3}{4}$–2$\frac{1}{2}$ in., subacute; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{3}{4}$–1 in., appearing panicled, the half-bractlike leaves at their base often deciduous; bracts $\frac{3}{4}$ by $\frac{1}{4}$ in., narrowly obovoid. *Calyx* $\frac{1}{3}$ in.; lobes ovate. *Corolla-tube* $\frac{1}{4}$ in., densely hairy to the base within; lobes $\frac{1}{8}$ by $\frac{1}{16}$ in., puberulous, subtomentose. *Anthers* ovate, low in the corolla-tube. *Ovary* 4-ovuled; style 0. *Drupe* not seen.—Very near *S. microstylis* except as to the obtuse corolla-lobes.

3. **S. unguiculata,** *Schauer in DC. Prodr.* xi. 623; leaves elliptic acuminate young stellately fulvous-hairy mature glabrate, corolla-lobes 5–6 oblong or narrowly obovoid. Congea unguiculata & ferruginea, *Wall. Cat.* 1736, 1737. Vitex involucratus, *Presl Bot. Bemerk.* 148. Symphorema unguiculatum, *Kurz For. Fl.* ii. 255.—Congeæ sp., *Griff. Notul.* iv. 91, n. 1353.

KHASIA MTS., alt. 2–3000 ft.; *Wallich, H. f. & T.*, &c. CACHAR; *Keenan.* CHITTAGONG; *Wallich.* MOULMEIN and TENASSERIM; *Griffith & Helfer* (Kew Distrib. n. 6010), &c. S. ANDAMAN; *Kurz.*

A large, climbing shrub. *Leaves* 6 by 2¼ in., base obtuse or rounded, scattered stellate hairs deciduous; petiole ¼ in. *Bracts* 1¼ by ½ in., spathulate-elliptic, obtuse, membranous, whitened, ultimately nearly glabrate. *Calyx* less than ⅙ in., obconic, stellately fulvous-tomentose; teeth triangular, rather rigid. *Corolla* pale yellow: tube hardly so long as the calyx, lobes ⅛–⅙ in., obtuse. *Stigma* sessile, bifid. *Drupe* (young) obovoid, glabrous, glandular at the apex.—This has larger leaves and bracts, shorter calyx and corolla, than *S. astylis.*

Sect. 2. **Eusphenodesma.** *Corolla-lobes* ovate or oblong. *Anthers* subexserted. *Style* filiform.

* *Bracts of the involucre small, shorter than the calyx.*

4. **S. eryciboides,** *Kurz in Flora* 1871, 345; leaves elliptic mature pubescent or grey-tomentose beneath, flower-heads nearly sessile fulvous-tomentose, corolla white. S. grossum, *Kurz For. Fl.* ii. 254. Sphenodesma? *Wall. Cat.* 9076.

PEGU and TENASSERIM, frequent; *Wallich, Helfer* (Kew Distrib. n. 6011).

A large, scandent shrub, or a small tree (Parish); shoots tomentose. *Leaves* 4½ by 2½ in., subacute, base rhomboid, glabrate above; petiole ⅓ in. *Heads* 7-fld., hardly ⅓ in. diam.; bracts ⅛ in., round-elliptic; peduncles numerous, 0–$\frac{1}{10}$ in., bracts at their base caducous, the inflorescence thus appearing a compound spike thyrse, or panicle. *Calyx* ⅙ in., broadly funnel-shaped, fulvous-tomentose, densely white-silky within, globular and inflated in fruit; teeth triangular. *Corolla* ¼ in.; lobes 5–6, narrowly obovoid, puberulous.

** *Bracts of the involucre mostly longer than the calyx.*

5. **S. triflora,** *Wight Ic.* t. 1478; leaves lanceolate grey-puberulous, panicles compound, heads short-peduncled 3-fld. *Griff. Notul.* iv. 182. Congea Jackiana, *Wall. Cat.* 1735, *partly.*

PENANG; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 6009, partly), *Maingay* (Kew Distrib. n. 1196).

Branchlets grey-puberulous. *Leaves* 5 by 1½ in., cuneate at both ends; petiole ⅓ in. *Panicles* 9 in. diam., ashy-pubescent; leaves ¼–½ in., half-bractlike; peduncles to the heads ⅛–¼ in.; bracts, usually 6 to each head, exceedingly variable in size on the same panicle; many small, lanceolate, hardly exceeding the calyx, others 1 by ¼ in., spathulate-elliptic, obtuse, membranous, reticulate, cinereous-puberulous. *Calyx* ⅛–⅙ in., ribbed, teeth triangular. *Corolla* ¼ in., throat hairy, lobes ovate. *Style* linear, subincluded. *Drupe* (imperfectly ripe) ⅙ in., narrowly obovoid, glabrous, 1-seeded; calyx not inflated.—A plant collected by Beccari in Borneo is perhaps not specifically separable, but has the heads shortly fulvous-villous.

6. **S. barbata,** *Schauer in DC. Prodr.* 623; branchlets and inflorescence patently rufous-hirsute, leaves elliptic acute hairy, heads 7-fld. closely capitate. S. ferrugineum, *Wight Ic.* t. 1474. Congea barbata, *Wall. Cat.* 1738. ? Viticastrum racemosum, *Presl Bot. Bemerk.* 148; *Walp. Rep.* vi. 691 (ex Schauer).

PENANG; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 6009, partly), *Maingay* (Kew Distrib. n. 1194).

Leaves 3 by 1¼ in., subacute at both ends, above thinly, beneath more thickly, rufous- or fulvous-hairy; petiole ⅛–⅙ in. *Peduncles* ½–1½ in., axillary and running into terminal panicles; bracts 1 by ⅓ in., spathulate-elliptic, obtuse, thinly rufous-pubescent. *Calyx* scarcely ⅙ in., densely rufous-hirsute. *Corolla* ⅙ in., blue. *Drupe* not seen.—Schauer l. c. doubtfully reduces here *Viticastrum racemosum,* Presl Bot. Bemerk. 148; but the description does not fit in several points; inter alia in the 5-celled ovary.

7. **S. Griffithiana,** *Wight Ic.* t. 1477, *text*; leaves ovate or lanceolate mature nearly glabrate, heads 7-fld., bracts oblong, fruit-calyx patently hairy teeth closely incurved with a narrow horn-like tooth recurved from each sinus. S. Jackianum, *Wight Ic.* t. 1477, *not of Schauer.* Decadontia cœrulescens, *Griff. Notul.* iv. 175. Symphorema pentandrum, *Kurz For. Fl.* ii. 255, *not* Sphenodesma pentandra, *Jack, nor* Congea pentandra, *Roxb.*

MERGUI; *Griffith.* TAVOY; *Helfer* (Kew Distrib. n. 6008).

A large, scandent shrub. *Leaves* 3½ by 1 in., oblong acuminate, or 3 by 2 in. ovate, acute, base rounded or obtuse; petiole ¼ in. *Panicles* terminal, 12–18 in. diam., leafless (i. e. main bracts caducous), minutely hairy, rufous-villous in the axils; peduncles ¼–1 in., slender, fulvous-pubescent; bracts 1 by ¼ in., spathulate-oblong, obtuse, membranous, nearly glabrous; flowers sessile. *Calyx* ⅛ in.; in fruit ⅙ in., slightly inflated, obconic. *Corolla* ⅓ in., purple; lobes ovate; throat hairy. *Drupe* not seen.

8. **P. pentandra,** *Jack in Mal. Misc.* i. 19, and in *Hook. Bot. Misc.* i. 285; leaves oblong or ovate acuminate mature nearly glabrous, calyx nearly glabrous funnel-shaped shortly 5-toothed in fruit mouth inflated with 5 accessory teeth. *Wight Ic.* t. 1475; *Griff. Notul.* iv. 181. S. Wallichiana & Jackiana, *Schauer in DC. Prodr.* xi. 622. S. acuminata, *Wight Ic.* t. 1476. Roscoea pentandra, *Roxb. Fl. Ind.* iii. 54. Congea pentandra & Jackiana, *Wall. Cat.* 1734, 1735. C. azurea, *Wall. Cat.* 1733, *partly.* Symphorema Jackianum, *Kurz For. Fl.* ii. 256.

From ASSAM and the KHASIA MTS. to MALACCA; frequent.

A scandent shrub. *Leaves* 4 by 1¼–1¾ in., base rounded or obtuse, maturely thinly hairy about the midrib beneath; petiole ¼ in. *Panicles* 6 15 in., often very dense with heads, sparingly pubescent; bracts 1 by ¼ in., broad-oblong, obtuse, membranous, glabrescent. *Calyx* ⅛–⅙ in., in fruit sometimes ⅓ in., glabrous within; teeth usually more prominent, sometimes triangular, acuminate in fruit; accessory teeth only developed after flower. *Corolla* ¼–⅓ in., glabrate without, densely hairy within, purple. *Ovary* fulvous-hirsute; style filiform, shortly bifid. *Drupe* size of a pea (Roxburgh), hairy, half hid in the calyx.—In unexpanded flowers the calyx-limb appears obtusely 5-toothed; after flowering the teeth are sometimes triangular abbreviated, sometimes lanceolate-subulate, and 5 linear teeth are developed in the sinuses. Wallich declares (in Hook. Bot. Misc. i. 286) that Jack mistook his Malacca plant for Roxburgh's Silhet one, and accordingly Wight and Schauer call the Malayan plant *S. Jackiana* or *acuminata*; but the calyx-teeth are so little longer, and other points so exactly accord, that the species have been united.

XXII. **CONGEA,** *Roxb.*

Large climbing shrubs. *Leaves* opposite, entire. *Cymes* peduncled, capitate, 3–9-fld., in large terminal panicles; bracts at the base of the peduncles leaf-like, often white or coloured; involucres to the cymes of 3 or 4 elliptic or oblong bracts, connate at the base. *Calyx* funnel-shaped, 5-toothed, slightly accrescent. *Corolla-tube* slender, rarely much longer

than the calyx, glabrate without; throat usually hairy; limb 2-lipped, upper lip erect-patent of 2 linear-oblong lobes, lower pendent of 3 much shorter obovate lobes. *Stamens* 4; anthers exserted, ovate; cells parallel. *Ovary* imperfectly 2-celled, 4-ovuled; ovules pendulous from the apex of the axis; style filiform, shortly bifid. *Drupe* small, obovoid, nearly dry; in the few examples seen 4-seeded, 4-partite.—Species 4, Malayan.

1. **C. vestita,** *Griff. Notul.* iv. 174, and *Ic. Pl. Asiat.* t. 458, fig. 21; branches patently fulvous-hirsute, leaves ovate villous beneath, involucral bracts broadly elliptic white-tomentose beneath, calyx white-hirsute teeth ovate-lanceolate.

TENASSERIM; *Helfer* (Kew Distrib. n. 6014); Mergui, and Donat Range, alt. 1500 ft., *Griffith.*

A large climber. *Leaves* 6 by 3 in., acute, base obtuse or shortly cordate, mature scabrous-pubescent above, villous and tomentose beneath; petiole ¼ in. *Panicles* very large, bracts like small whitened leaves; involucral bracts 1 by ⅝ in., not attenuate at the base. *Calyx* ¼–⅓ in., funnel-shaped, lobed ⅓ the way down. *Corolla* glabrous without, tube shorter than the calyx; limb 2-lipped, rose, somewhat brown-striated, especially the upper lip (Griffith). *Ovary* glabrous, glandular upwards. *Drupe* nearly dry, obovoid, 4-partite.

2. **C. velutina,** *Wight Ic.* t. 1479, 3 or 1566; leaves ovate acuminate mature glabrous, involucral bracts spathulate-oblong distinctly nervose, calyx densely shortly hirsute teeth triangular.

TENASSERIM; at Mergui, *Griffith* (Herb. Propr. n. 838). TAVOY; *Helfer* (Kew Distrib. n. 6012).

A large climber; branches closely pubescent. *Leaves* 5 by 2½ in., base obtuse or rounded, young thinly sparsely pubescent; petiole ⅕ in. *Panicle* large, more lax than in *C. vestita*, closely pubescent, nodes villous; bracts 1¼ by ⅓ in., obtuse, base attenuate, tomentose beneath. *Calyx* ⅛ in., lobed scarcely ¼ the way down. *Corolla* small, tube shorter than the calyx; limb white, somewhat brown, streaked near the base of the lobes (Griffith). *Drupe* not seen.

3. **C. villosa,** *Wight Ic.* t. 1479, 1, fig. B; leaves ovate or oblong mature villous beneath, involucral bracts spathulate-oblong, calyx tomentose teeth shortly triangular. Roscoea villosa, *Roxb. Hort. Beng.* 95, and *Fl. Ind.* iii. 56, and *Ic. Ined. at Kew.*

PEGU; Rangoon (Roxburgh). MERGUI; *Griffith* (Kew Distrib. n. 6012, partly).

A large climber, resembling *C. velutina*, but the leaves very villous beneath. *Leaves* in Roxburgh's drawing ovate, in Griffith's example oblong; glabrate above except the midrib. *Panicle* large, very lax; bracts uniformly 4 in Griffith's example, 3 (one of which is often bifid) in Roxburgh's picture; resembling in form the bracts of *C. velutina.*

4. **C. tomentosa,** *Roxb. Cor. Pl.* iii. 90, t. 293; branchlets tomentose, leaves ovate acute softly hairy beneath, involucral bracts elliptic, calyx shaggy toothed ⅛ the way down. *Wight Ic.* t. 1479, 2 or 1565; *Schauer in DC. Prodr.* xi. 623; *Kurz For. Fl.* ii. 256. Roscoea tomentosa, *Roxb. Hort. Beng.* 95, and *Fl. Ind.* iii. 57. Calochlamys capitata, *Presl Bot. Bemerk.* 149.

CHITTAGONG; *Roxburgh.* BURMA; *Griffith* (Kew Distrib. n. 6013).—DISTRIB. Siam.

A large climber. *Leaves* 3 by 2¼ in., base rounded or shortly cordate, minutely setulose above, closely villous beneath. *Bracts* 1 by ½ in., not attenuated at base, tomentose, white or lilac-blue. *Corolla* white.

VAR. *azurea*; leaves elliptic acute more thinly hairy beneath, bracts oblong or narrowly oblong, calyx larger lobed half-way down teeth broadly lanceolate. C. azurea, *Wall. Cat.* 1733; *Wight Ic.* t. 1479, 1, fig. A. C. tomentosa *var.* oblongifolia, *Schauer l. c.* 624, *excl. syn. Roxb.*—Pegu and Tenasserim, frequent; *Wallich M'Lelland*, &c. Cultivated in N. India.

XXIII. **AVICENNIA,** *Linn.*

Shrubs or small trees. *Leaves* opposite, entire coriaceous. *Cymes* contracted, or densely capitate heads peduncled, in the penultimate axils or in a trichotomous corymb; bracts and bracteoles small. *Calyx* 5-partite, unaltered in fruit; segments ovate, concave, deeply imbricate. *Corolla-tube* short-cylindric, limb spreading 5–4-lobed. *Stamens* 4, on the corolla-throat; anthers shortly exserted, ovate; cells parallel. *Ovary* imperfectly 4-celled by a 4-winged central column, 4-ovuled; ovules pendulous between the wings of the central column; style long or short, tip bifid. *Capsule* broad, compressed, dehiscing by 2 thick valves, 1-seeded. *Seed* erect; embryo imperfectly clothed by its two integuments; cotyledons large, plaited lengthwise; radicle inferior, villous.

A. officinalis, *Linn.*; *Schauer in DC. Prodr.* xi. 700; leaves obovate or elliptic obtuse whitened beneath, corolla-limb glabrate yellow, style short. *Bedd. For. Man.* 174, and *Anal. Pl.* xx. fig. 2; *Brand. For. Fl.* 371; *Boiss. Fl. Orient.* iv. 536. A. resinifera, *Forst.*; *Decne. in Nouv. Ann. Mus.* iii. 402. A. tomentosa, *Jacq.*; *Br. Prodr.* 518; *Roxb. Fl. Ind.* iii. 88; *Wall. Pl. As. Rar.* iii. 44, t. 271; *Wight Ic.* t. 1481; *Griff. Notul.* iv. 185; *Kurz For. Fl.* ii. 276. Halodendron Thouarsii, *Roem. & Sch. Syst.* iii. 485.—*Rumph. Herb. Amb.* iii. t. 76. *Rheede Hort. Mal.* iv. t. 45.

Mangrove swamps of the DECCAN PENINSULA and CEYLON, common; less frequent in the Malay Peninsula.—DISTRIB. Malaya, Shores of the Indian and Pacific Ocean.

A shrub, or tree, 25 ft. *Leaves* 3½ by 1½ in., base tapering, beneath with hard tomentum or glabrate; petiole ⅓ in. *Bract* $\frac{1}{12}$ in., ovate; bracteoles similar, rather smaller. *Calyx* ⅛ in., minutely pubescent. *Corolla* ¼ in.; lobes 4, ovate, acute, or one lobe shortly bifid, or lobes 5 subequal (not rarely all forms on one bush). *Style* distinct, sometimes nearly as long as the hairy ovary. *Fruit* 1 in.

VAR. *alba*, Blume Bijd. 821 (sp.); leaves lanceolate acute, style short or hardly any. *Decne. l. c.*; *Wight Ic.* t. 1482. A. resinifera, *Griff. Notul.* iv. 186, and in *Trans. Linn. Soc.* xx. 6, fig. 1. A. intermedia, *Griff. l. c.* A. officinalis, *Kurz For. Fl.* ii. 275.—Malay Peninsula; common. Distrib. Malaya, S.E. Asia, N. Australia.—Mr. Bentham considers the American and African *A. tomentosa* not specifically separable.

ORDER CXII. **LABIATÆ.** (By J. D. Hooker.)

Herbs, rarely shrubs, usually loaded with oil-glands. *Stem* usually 4-gonous. *Leaves* opposite or whorled, stipules 0. *Flowers* irregular, solitary 2-nate or fascicled and axillary, or in centrifugal spicate cymes which by their union in pairs form false whorls. *Calyx* persistent, subregular, 4–5-cleft or 2-lipped. *Corolla* monopetalous, hypogynous; limb 4–5-lobed or 2-lipped, lobes imbricate in bud. *Stamens* inserted in the corolla-tube, 4 didynamous, or the 2 upper imperfect. *Anther-cells* connate or separate or confluent. *Disc* prominent. *Ovary* free, 2 of 2-celled carpels; style simple, inserted between the lobes, stigma usually 2-fid; ovules one in each cell, erect, anatropous. *Fruit* of 4 dry or rarely fleshy 1-seeded lobes (nutlets) at the base of the calyx. *Seeds* small, erect, albumen sparing

or 0, radicle inferior.—Species about 2600, chiefly of north temperate regions.

Tribe 1. **Ocimoideæ.** Perfect *stamens* 4, rarely 2, declinate; anther-cells confluent. *Ovary* 4-partite. *Nutlets* dry, basal scar small.

Subtribe 1. EUOCIMEÆ. Upper *calyx-lobe* usually broadest. *Corolla* with 4 of the lobes equal or the 2 upper connate, the lower (lip) dissimilar. *Stamens* usually exserted.

* *Lower lip of corolla flat or nearly so.*

Fruiting calyx deflexed, upper tooth very large, decurrent, stigma 2-fid . . . . 1. OCIMUM.
Fruiting calyx suberect or declinate, tube deeply pitted 2. GENIOSPORUM.
Fruiting calyx declinate, 2-lipped, upper filaments toothed . . . . 3. MESONA.
Fruiting calyx declinate, 2-lipped; filaments simple, included . . . . 4. PLATYSTOMA.
Fruiting calyx suberect, 4 lower teeth cuneate; filaments simple, included . . . . 5. ACROCEPHALUS.
Fruiting calyx usually declinate, equally 5-toothed, or upper tooth broader; filaments included . . . . . 6. MOSCHOSMA.
Fruiting calyx deflexed; corolla-tube often long; stigma entire . . . . 7. ORTHOSIPHON.

** *Lower lip of corolla concave or boat-shaped.*

Calyx equally 5-toothed or 2-lipped; filaments free . . 8. PLECTRANTHUS.
Stamens 4; filaments connate below . . . . 9. COLEUS.
Calyx-mouth oblique, upper lip usually decurved; filaments free . . . . 10. ANISOCHILUS.
Corolla-lip deflexed, contracted at the base . . . . 10*. HYPTIS.

Subtribe 2. LAVANDULEÆ. *Corolla* 2-lipped; upper lip 2-fid, lower 3-fid. *Stamens* included. *Nutlets* with an oblique basal scar.

11. LAVANDULA.

Tribe 2. **Satureineæ.** Perfect *stamens* 4 with the upper pair longest, or 2, straight diverging or ascending; anthers (1- or) 2-celled, cells short. *Corolla-lobes* flat.

Subtribe 1. POGOSTEMONEÆ. *Stamens* 4; filaments straight; anthers 1-celled.

Calyx 5-toothed; corolla 4-fid, lip spreading . . . . 12. POGOSTEMON.
Calyx 5-toothed; corolla subequally 4-fid; stamens exserted . . . . 13. DYSOPHYLLA.
Calyx 5-partite, segments plumose; stamens included . 14. COLEBROOKIA.

Subtribe 2. MENTHOIDEÆ. *Stamens* 4 or 2, distant, erect or spreading; anthers 2-celled (at least when young).

* *Whorls many-fld., spiked or racemed, not axillary.*

Fruiting calyx erect, elongate; stamens 4 . . . . . 15. ELSHOLTZIA.
Fruiting calyx declinate, 2-lipped; stamens 4 . . . . 16. PERILLA.
Stamens 2 . . . . 17. MOSLA.

** *Whorls many-fld., axillary, rarely spicate; calyx 10–13-nerved.*

Calyx 10-nerved; stamens 4, anther-cells parallel . . 18. MENTHA.
Calyx 4–5-toothed stamens 2; nutlets truncate . . 19. LYCOPUS.

*** *Whorls many-fld., capitate, involucrate.* *Stamens* 4. 20. ORIGANUM.

**** *Whorls few-fld.* *Stamens* 4 . . . . . . 21. THYMUS.

***** *Whorls axillary secund.* *Calyx* 15-*nerved.* 22. HYSSOPUS.

Subtribe 3. MELISSEÆ. *Calyx* 13-nerved. *Corolla* 2-lipped. *Stamens* 2 or 4, ascending.

Calyx 5-toothed . . . . 23. MICROMERIA.
Calyx 2-lipped; corolla-tube nearly straight . . . . 24. CALAMINTHA.
Calyx 2-lipped; corolla-tube recurved . . . . 25. MELISSA.

Tribe 3. **Monardeæ.** Perfect *stamens* 2, ascending, parallel; anther-cells linear, solitary or separated by a filiform connective.

Anther-cells equal, contiguous, pendulous from a small connective . . . . 26. PEROWSKIA.
Anther-cells equal, distant, pendulous from a long connective . . . . 27. MERIANDRA.
Anther-cells very unequal or solitary, on a long connective . . . . 28. SALVIA.

Tribe 4. **Nepeteæ.** Perfect *stamens* 4 with the upper pair longest, rarely 2, ascending or diverging; anthers 2-celled, cells at length diverging. *Ovary* 4-partite. *Nutlets* dry, with a small basal areola.

Calyx tubular, 5-toothed . . . . 29. NEPETA.
Calyx 2-lipped, upper lip much the largest . . . . . 30. DRACOCEPHALUM.
Calyx 2-lipped, lateral lobes of upper lip on the face of the midlobe . . . . 31. LALLEMANTIA.

Tribe 5. **Stachydeæ.** Perfect *stamens* 4, ascending, lower pair longest. *Calyx* 5–10-nerved. Upper lip of *corolla* erect hooded, lower spreading 3-fid. *Nutlets* dry, basal areola small.

Subtribe 1. SCUTELLARIEÆ. *Calyx* 2-lipped, mouth closed after flowering.

Fruiting calyx 2-partite; lips entire, upper with a broad plate . . . . 32. SCUTELLARIA.
Fruiting calyx tubular, upper lip 3- lower 2-toothed . 33. BRUNELLA.

Subtribe 2. MARRUBIEÆ. *Calyx* tubular or campanulate. *Stamens* included in the corolla-tube . . . . 34. MARRUBIUM.

Subtribe 3. LAMIEÆ. *Calyx* tubular or campanulate. *Stamens* exserted from the corolla-tube.

* *Upper lip of the corolla short, nearly flat, glabrous or pubescen*

Calyx subglobose; anther-cells divaricate; nutlets subglobose . . . . 35. CRANIOTOME.
Anther-cells of lower stamens parallel, transverse, of upper dimidiate . . . . 36. ANISOMELES.
Anther-cells confluent; nutlets hispid or scaly . . . 37. ACHYROSPERMUM.
Anther-cells confluent; nutlets winged. . . . . . . 38. COLQUHOUNIA.

** *Upper lip of the corolla hooded, villous.*

Calyx 5-toothed; anther-cells divergent; nutlets obtuse 39. STACHYS.

Calyx 5-spinous; anther-cells ciliate; nutlets compressed	40. GALEOPSIS.
Calyx 5-spinous; anther-cells parallel; nutlets triquetrous	41. LEONURUS.
Calyx 5-toothed; anther-cells hairy; nutlets triquetrous	42. LAMIUM.
Calyx-lobes 5, oblong 5-reticulate	43. ROYLEA.
Calyx-limb dilated; fruiting very large, membranous .	44. OTOSTEGIA.
Calyx 8–10-toothed; corolla lower lip large	45. LEUCAS.
Calyx 8–10-toothed; corolla lower lip very small . .	46. LEONOTIS.
Calyx 5-toothed; corolla upper lip compressed . . .	47. PHLOMIS.
Calyx-teeth 5, membranous, with hooked awns . . .	48. NOTOCHÆTE.
Calyx-teeth 5, broad, apiculate or spinous; nutlets bearded	49. EREMOSTACHYS.
Calyx-limb very broad membranous, broadly 5-toothed	50. ERIOPHYTON.

Tribe 6. **Prasieæ.** *Calyx, corolla* and *stamens* of *Stachydeæ. Ovary* 4-partite or 4-fid. *Nutlets* smooth, thick or fleshy, with a small basal areola.

Calyx 5-toothed; corolla-tube slender, throat broad .	51. GOMPHOSTEMMA.

Tribe 7. **Ajugoideæ.** *Calyx* 10-nerved. *Stamens* 4, ascending. *Ovary* 4-lobed. *Nutlets* with a large very oblique or lateral areola.

Upper corolla-lip very short; stamens very long straight diverging	52. LEUCOSCEPTRUM.
Upper corolla-lip very short, 2-fid, with the incurved stamens exserted from the cleft; nutlets minute . .	53. TEUCRIUM.
Upper corolla-lip short, notched, usually shorter than the incurved stamens	54. AJUGA.
Upper corolla-lip arched, longer than the stamens . .	55. CYMARIA.

1. OCIMUM, *Linn.*

Strongly scented herbs, undershrubs, or shrubs. *Whorls* 6–10-fld., spiked or racemed, tips of pedicels recurved; bracts minute, caducous; flowers small. *Calyx* ovoid or campanulate, deflexed in fruit; upper tooth broadest, decurrent, 2 lower acuminate. *Corolla-tube* short, not annulate within; upper lip subequally 4-fid, lower hardly longer declinate entire. *Stamens* declinate, exserted, filaments free or the lower connate below, naked or the upper toothed or hairy below; anther-cells confluent. *Disc* entire or 3–4-lobed. *Style-lobes* subulate or flattened. *Nutlets* smooth or subrugose, mucilaginous when moistened.—Species about 40, tropical and chiefly Asiatic.

1. **O. canum,** *Sims Bot. Mag.* t. 2452 (*stamineum* in text); herbaceous, erect, pubescent, leaves petioled narrowly ovate toothed or entire, bracts petioled, two lower calyx-teeth ovate-lanceolate awned longer than the rounded upper, lateral smaller than the lower, corolla $\frac{1}{6}$ in. long. *Wall. Cat.* 2714 A; *Benth. in DC. Prodr.* xii. 32; *Grah. Cat. Bomb. Pl.* 147; *Dalz. & Gibs. Bomb. Fl.* 203. O. americanum, *Linn. Amœn. Acad.* iv. 276, and *Sp. Pl.* 833, *not of Jacq.* O. album, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 15, *not of Linn.*

Plains and lower hills of INDIA; from Silhet, Bengal, Behar and Central India to the S. Deccan, &c. CEYLON; abundant about native gardens, *Thwaites.*—DISTRIB. Java, W. Asia, Trop. Africa, Madagascar (America, cult.).

Branched from the base, 1–2 ft. high. *Leaves* 1–1½ in.; petiole very slender,

usually ciliate. *Spikes* 3–8 in.; whorls rather close; flowers subsessile; bracts ovate, awned, not so large as the nearly glabrous calyx, ciliate. *Filaments* twice as long as the white corolla, hairy at the knee. *Nutlets* pitchy-black, narrowly ellipsoid, punctulate.

2. **O. Basilicum,** *Linn*; herbaceous, erect, glabrous or pubescent, leaves ovate toothed or entire, bracts petiolate, fruiting calyx very shortly pedicelled, two lower teeth ovate-lanceolate awned longer than the rounded upper, lateral smaller than the lower, corolla $\frac{1}{3}$–$\frac{1}{2}$ in. long. *Lamk. Ill.* t. 514; *Burm. Fl. Ind.* 129; *Hayne Gew.* xi. t. 3; *Boiss. Fl. Orient.* iv. 539; *Roxb. Fl. Ind.* iii. 17; *Benth. in DC. Prodr.* xii. 33; *Wall. Cat.* 2713 & 2714 (*O. canum in part*); *Dalz. & Gibs. Bomb. Fl.* 203; *Grah. Cat. Bomb. Pl.* 147. O. minimum, *Burm. Fl. Ind.* 129, *not of Linn.* O. hispidum, *Lamk. Dict.* i. 384. O. pilosum, *Willd. Enum. Hort. Berol.*; *Roxb. l. c.* 16; *Fleming in Asiat. Res.* xi. 173. O. menthæfolium, *Benth. in DC. l. c.* (the Indian plant). O. ciliatum, *Hornem. Hort. Hafn.* ii. 565. O. americanum, *Jacq. Hort. Vind.* iii. t. 86, *not of Linn.* O. album, *Linn. Mant.* 85, *not of Roxb.* O. integerrimum, *Willd. Sp. Pl.* iii. 162. O. caryophyllatum, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 16. O. Basilicum, *var.* thyrsiflorum, *Wight Ic.* t. 868; *Benth. Lab.* 5, and in *Wall. Pl. As. Rar.* ii. 13; *Wall. Cat.* 2715. O. thyrsiflorum, *Linn. Mant.* 84; *Jacq. Hort. Vind.* iii. t. 72; *Roxb. Fl. Ind.* 15. O. Barrelieri, *Roth Nov. Sp.* 278. Plectranthus Barrelieri, *Spreng. Syst.* ii. 691.—*Rheede Hort. Mal.* x. t. 87.

Throughout tropical and hotter INDIA, cultivated from the PUNJAB to Ava, Travancore, Malacca and Penang. Indigenous in the PUNJAB on low hills, *Aitchison.* CEYLON, cultivated; *Thwaites.*—DISTRIB. Hotter W. Asia, Africa, the Malay and Pacific Islands (perhaps always cultivated only).

This widely cultivated plant differs from *O. canum* chiefly in the much larger size of all its parts, the flowers and seeds being often three times as large. *Corolla* white, pink or purplish. I cannot distinguish the varieties described by Bentham by any constant characters. It varies much in robustness and the hairiness of all its parts. Var. *thyrsiflora* is a luxuriant state; var. *difforme,* Benth. l. c. (*O. lacerum,* Heyne in Herb. Rottl., *O. bullatum,* Lamk.), has abnormal deeply cut leaves; var. *purpurascens,* Benth. l. c. (*O medium,* Mill.), is a purple-coloured state, imported from Persia; var. *glabratum* has very large fruiting calyces sometimes $\frac{1}{4}$ in. diam., with a rather elongate upper lobe. *O. ciliatum,* Hornem. (*O. ciliare,* Heyne in Herb. Rottl., *O. scabrum,* Herb. Wight), has a hispidulous white corolla; it is cult. in Hort. Calcutt. under the erroneous name of *O. cristatum,* Roxb.

3. **O. gratissimum,** *Linn.*; shrubby, glabrescent, leaves ovate acute crenate or coarsely toothed, bracts sessile lanceolate awned from a rounded base, two lower calyx-teeth minute much shorter than the rounded upper, lateral triangular broader than the lower, corolla $\frac{1}{6}$ in. *Jacq. Ic. Pl. Rar.* iii. t. 495; *Wall. Cat.* 2720; *Roxb. Fl. Ind.* iii. 17; *Benth. in DC. Prodr.* xii. 34 (excl. syn.); *Grah. Cat. Bomb. Pl.* 147; *Dalz. & Gibs. Bomb. Fl.* 203. O. citronatum, *Ham.*, and O. robustum, *Heyne in Herb. Wall.*—*Rheede Hort. Mal.* x. t. 86.

BENGAL, CHITTAGONG, E. NEPAL, and throughout the DECCAN PENINSULA; and CEYLON, doubtful if indigenous.—DISTRIB. Java, Trop. Africa and America (? native).

A shrub, 4–8 ft., much branched, woody below. *Leaves* 2–4 in.; petiole 1–2 in. *Racemes* strict, slender; whorls rather close-set; pedicels shorter and bracts longer than the calyx. *Calyx* pubescent, fruiting $\frac{1}{4}$ in. long, recurved. *Corolla* hardly exceeding the calyx, pale yellow. *Filaments* exserted, knee bearded. *Nutlets* subglobose, rugose with glandular depressions.

VAR. *suavis*; leaves densely softly tomentose on both surfaces. O. suave, *Willd. Enum. Hort. Berol.* 629; *Benth. in DC. Prodr.* xii. 35, *excl. various syn.*; *Thwaites Enum.* 236. O. urticæfolium, *Roth Catal. Bot.* ii. 52. O. menthæfolium, *Hochet. in Schimp. Herb. Abyss.* n. 1860.—Ceylon; Ambagamowa district, *Thwaites.*—Distrib. Trop. Africa and Madagascar (apparently native). Cult. in W. Indies, &c.—This differs from *O. gratissumum* only in pubescence.

4. **O. adscendens,** *Willd. Sp. Pl.* iii. 166; herbaceous, puberulous, erect, or prostrate with ascending branches, leaves small oblong-ovate obtuse entire or sparingly toothed, floral lanceolate petiolate, two lower calyx-teeth reduced to short bristles, upper broadly obovate, lateral truncate ciliate, corolla $\frac{1}{8}$ in. *Wall. Cat.* 2719; *Benth. in DC. Prodr.* xii. 35; *Dalz. & Gibs. Bomb. Fl.* 203. O. indicum, *Roth Nov. Sp.* 273. O. cristatum, *Roxb. Hort. Beng.* 45, and in *Fl. Ind.* iii. 19. O. verticillatum, *Heyne in Herb. Rottl.* Plectranthus indicus, *Spreng. Syst.* ii. 691.

The DECCAN, in sandy places; *Heyne*, &c. CENTRAL INDIA; Jubbulpore, *Beddome.*

Annual, very variable in habit, 4–16 in. high; branches often widely spreading. *Leaves* $\frac{1}{2}$–1 in., narrowed into the petiole. *Racemes* short, rather lax-fld.; bracts lanceolate, caducous, with a gland at the base. *Corolla* $\frac{1}{6}$ in., pale rose. *Filaments* twice as long as the corolla; knees dilated, hairy. *Fruiting calyx* $\frac{1}{4}$–$\frac{1}{3}$ in.; lower lip as long as the upper, rather membranous. *Nutlets* subglobose, compressed, smooth, red-brown.

5. **O. sanctum,** *Linn. Mant.* 85; herbaceous, erect, softly patently hairy, leaves oblong obtuse or acute entire or subserrate, floral sessile ovate-lanceolate or cordate, racemes very slender, calyx short, two lower teeth very long-awned longer than the broadly oblong upper, lateral broadly ovate shorter than the lower, corolla scarcely exceeding the calyx. *Roxb. Fl. Ind.* iii. 14; *Wall. Cat.* 2716; *Benth. in DC. Prodr.* xii. 38, and in *Fl. Austral.* v. 74; *Grah. Cat. Bomb. Pl.* 147; *Dalz. & Gibs. Bomb. Fl.* 204; *Thwaites Enum.* 236; *Boiss. Fl. Orient.* iv. 539. O. monachorum, *Linn. Mant.* 85. O. tenuiflorum, *Linn. Sp. Pl.* 833; *Benth. in DC. l. c.* 39. O. inodorum, *Burm. Thes. Zeyl.* 174, t. 80, f. 2, and *Fl. Ind.* 130, *not of Koenig.*—*Burm. Thes. Zeyl.* 174, t. 80, f. 1; *Rumph. Herb. Amb.* v. t. 92, f. 2. Parnassa, *Jones in Asiat. Research.* iv. 288.

Throughout INDIA, ascending the Himalaya to 6000 ft. (doubtfully indigenous). CEYLON; common in waste places, *Thwaites.*—DISTRIB. Malay Islands to Australia and the Pacific, W. Asia to Arabia.

Stem sometimes woody below; branches erect, ascending or spreading. *Leaves* 1-2$\frac{1}{2}$ in., variable in breadth, base narrowed. *Racemes* 6–8 in. long; pedicels as long as the calyx. *Corolla* very small, hardly longer than the calyx. *Filaments* exserted, knee villous. *Fruiting calyx* $\frac{1}{6}$ in. long, on a slender pedicel, broadly campanulate, membranous. *Nutlets* subglobose or broadly oblong, slightly compressed, nearly smooth, pale red-brown.

VAR. *hirsuta*; densely pubescent. O. hirsutum, *Benth. in Wall. Pl. As. Rar* ii. 14; *Wall. Cat.* 2717? O. villosum, *Roxb. Fl. Ind.* iii. 13. O. subserratum, *Heyne in Herb. Rottl.*—South Deccan.

DOUBTFUL SPECIES.

O. MINIMUM, *Linn.* (*Benth. in DC. Prodr.* xii. 33), is a very small cultivated form, probably of *O. Basilicum* (with which it agrees in all essential characters), to which Linnæus has assigned Ceylon as a habitat. I have seen specimens from gardens in various parts of the world.

2. GENIOSPORUM, *Wall.*

Herbs. *Whorls* many-fld., in long lax racemes or spikes; bracts often

coloured; flowers small or minute. *Calyx* ovoid in flower, in fruit tubular, suberect or declinate, 5-toothed, upper tooth broadest, not decurrent; lateral free, or connate with the upper; lower short, free or connate. *Corolla-tube* short, upper lip 4-fid, lower declinate entire. *Filaments* free, toothless. *Disk* tumid, gibbous. *Style-arms* short, flattened. *Nutlets* ovoid or oblong, smooth or punctulate.—Species 6 or 7, Indian and African.

1. **G. strobiliferum,** *Wall. Cat.* 2749; erect, puberulous, leaves petioled lanceolate coarsely serrate, floral exceeding the flowers, fruiting calyces erect, throat glabrous. *Benth. Lab.* 20, and in *DC. Prodr.* xii. 45; *Hook. Ic. Pl.* t. 462. Plectranthus coloratus, *Don Prodr.* 116.—Labiata, *Griff. Itin. Notes,* 82, n. 1192.

SUBTROPICAL HIMALAYA; in dry forests from Kumaon to Bhotan, alt. 1–5000 ft. KHASIA MTS., alt. 3–5000 ft., common.

Stem 2–3 ft., obtusely angled. *Leaves* 2–5 by $1\frac{1}{2}$–2 in., base acute or rounded, narrowed into the petiole of $\frac{1}{4}$–$\frac{3}{4}$ in. *Spikes* 2–5 in.; bracts white, deciduous. *Flowers* $\frac{1}{4}$ in. long. *Calyx* pubescent, with 2 black glands on the lower lip. *Corolla* white with purple veins, hairy, lower lip narrow. *Filaments* exserted. *Fruiting calyx* tubular, pedicelled, $\frac{1}{8}$ in. long, deeply pitted. *Nutlets* ellipsoid, black, smooth, hispid towards the top.

2. **G. elongatum,** *Benth. Lab.* 21, and in *DC. Prodr.* xii. 45; erect or ascending, pubescent, stems very slender, leaves subsessile narrowly lanceolate, lower floral exceeding the flowers, fruiting calyces spreading, throat naked. *Thwaites Enum.* 236. Rhinanthus indica, *Linn.*; *Burm. Fl. Ind.* 131, t. 39, f. 1.

NORTHERN CIRCARS; Jeypur Hills, *Beddome.* CEYLON; Central Province, in grassy places, alt. 4–6000 ft.

Stem 1–2 ft., angles thickened. *Leaves* in distant pairs, 1–2 by $\frac{1}{4}$–$\frac{1}{3}$ in., crenate-serrate, base narrowed. *Spikes* 3–5 in.; bracts orbicular-ovate, subpersistent; flowers $\frac{1}{10}$ in. long. *Calyx* hirsute. *Corolla* very small, hairy. *Filaments* exserted. *Fruiting calyx* $\frac{1}{12}$ in. long, ovoid, strongly ribbed, pitted, lobes short. *Nutlets* ellipsoid, smooth.

3. **G. prostratum,** *Benth. in Pl. As. Rar.* ii. 18, *Lab.* 21, 708, and in *DC. Prodr.* xii. 45; prostrate, stems slender glabrous pubescent or hirsute, leaves small sessile or petioled obovate-lanceolate or oblong or linear sparingly toothed, fruiting calyces spreading shorter than their pedicels, calyx-throat with a ring of hairs. *Wall. Cat.* 2751; *Grah. Cat. Bomb. Pl.* 148; *Thwaites Enum.* 237. Ocimum menthoides, *Burm. Fl. Ind.* 129. O. prostratum, *Linn. Mant.* 166. O. macrostachyum, *Poir. Suppl.* i. 492; *Benth. Lab.* 16. O. tenuiflorum, *Heyne in Herb. Rottl., not of Benth.* ? *of Linn.* Mentha ocimoides, *Lamk. Dict.* iv. 103. Elsholtzia ocimoides, *Pers. Syn.* ii. 114. Lumnitzera prostrata, *Spreng. Syst.* ii. 687. Thymus indicus, *Burm. Fl. Ind.* 129.—Mentha, *Burm. Thes. Zeyl.* 158, t. 70, f. 2.

DECCAN PENINSULA, from the Concan southwards. CEYLON; warmer part of the island.

Stems many from a woody stock. *Leaves* in distant pairs, very variable, from $\frac{1}{4}$ by $\frac{1}{8}$ in. to 2 by $\frac{3}{4}$ in., rather thick, base narrowed. *Spikes* elongate, slender; whorls close or distant; bracts ovate, acute, reflexed; flowers minute, pedicelled. *Calyx* hairy, upper lip very variable in size, throat hairy. *Corolla* $\frac{1}{18}$ in., hairy. *Filaments* exserted. *Fruiting calyx* $\frac{1}{13}$ in., subcampanulate, ribbed, tube not pitted, pubescent. *Nutlets* extremely minute, ellipsoid, smooth, naked.

VAR. *gracilis,* Thwaites Enum. 237; stems very slender, 12–18 in., leaves glabrous, narrower. G. gracile, *Benth. Lab.* 21, and in *DC. Prodr.* xii. 45.—Deccan Peninsula and Ceylon.

3. **MESONA,** *Blume.*

Annuals. *Whorls* many-fld., racemose; flowers small; bracts caducous. *Calyx* campanulate; fruiting tubular, declinate, 2-lipped, tube deeply pitted between the nerves; lips rather broad, upper 3-fid, lower entire. *Corolla-tube* short, upper lip truncate or 4-toothed, lower oblong. *Stamens* 4, filaments exserted, free, upper toothed at the base. *Style* 2-fid. *Disk* tumid, gibbous. *Nutlets* ellipsoid or ovoid.—Species 4, Trop. Asiatic and Malayan.

M. Wallichiana, *Benth. in DC. Prodr.* xii. 46; erect, sparsely hairy, leaves ovate-lanceolate serrate. Geniosporum parviflorum, *Wall. Cat.* 2750; *Benth. Lab.* 20, and in *Wall. Pl. As. Rar.* ii. 18.

KHASIA MTS., alt. 3–5000 ft.; *De Silva,* &c.

Stem 1–2 ft., branching upwards, slender, rigid. *Leaves* 1–3 in., narrowed into a petiole ¼–¾ in. *Racemes* numerous, slender, erect, 3–7 in.; flowers very numerous, purplish, ⅛ in. long; bracts deflexed, ovate, purplish. *Fruiting calyx* ⅙ in. long, on a slender rigid pedicel longer than itself. Smells like Patchouli.

4. **PLATYSTOMA,** *Beauv.* (Platostoma.)

Small annuals. *Whorls* many-fld., racemose; flowers minute; bracts caducous. *Calyx* campanulate; fruiting deflexed 2-lipped, upper lip ovate, toothed on each side; lower broad inflexed, sinus very open. *Corolla-tube* short; lips subequal, upper broad 2-fid, lower entire concave. *Stamens* 4, declinate, filaments free included, dilated downwards. *Disk* tumid, gibbous. *Style* 2-fid. *Nutlets* ovoid.—Species 3, Indian and African.

P. flaccidum, *Benth. in Gen. Pl.* ii. 1173; sparingly pubescent, leaves ovate serrate, fruiting pedicel as long as the calyx-tube. Ocimum flaccidum, *A. Rich. Tent. Fl. Abyss.* ii. 179.

The CONCAN; on the Kela nuddeh, *Ritchie, Dalzell.*—DISTRIB. Trop. Africa.

Strict, erect, slender, 4–8 in. high, simple or branched, branches erect. *Leaves* ½–1 in., membranous. *Racemes* slender, strict, as long as the whole plant; flowers $\frac{1}{12}$ in. long. *Calyx-lobes* ovate. *Nutlets* black, minutely reticulate.—Probably only a state of *P. africanum,* Beauv.

5. **ACROCEPHALUS,** *Benth.*

Annuals. *Whorls* in terminal or axillary globose or ovoid dense heads with imbricate bracts; flowers very small, sessile. *Calyx* ovoid, fruiting tubular, base gibbous; upper lip flat, entire, lower entire or 4-toothed; throat naked. *Corolla-tube* very short, subequally 4-lobed. *Stamens* 4, filaments free, toothless, included. *Disk* small, gibbous. *Style* 2-fid. *Nutlets* smooth.—Species 10, Tropical and Subtropical Asiatic and African.

1. **A. capitatus,** *Benth. in Wall. Pl. As. Rar.* ii. 18, *Lab.* 23, and in *DC. Prodr.* xii. 47; sparingly pubescent, leaves petioled few-nerved, heads terminal. *Dalz. & Gibs. Bomb. Fl.* 204; *Hook. Ic. Pl.* t. 456. A. scariosus, *Wall. Cat.* 1563. A. Blumei, *Benth. l. c.* Prunella indica, *Burm. Fl. Ind.* 130. Ocimum capitellatum, *Linn. f. Suppl.* 276. O. capitatum, *Roth Nov. Sp.* 276. O. acrocephalum, *Blume Bijd.* 834. O. Chandra, *Ham. in Herb. Wall.* Lumnitzera capitata, *Spreng. Syst.* ii. 687.

Throughout INDIA from Kashmir to Bhotan in the Himalaya, ascending to 5000 ft.; and in hilly districts from the Khasia Mts. to Cape Comorin and Pegu. (Not seen from Ceylon or the Malay Peninsula.)—DISTRIB. Muneypoor, Burma, Java, Borneo.

Stem 6–12 in., simple or branched from the base; branches ascending or decumbent. *Leaves* ½–1 in., ovate or lanceolate, coarsely serrate, narrowed into the petiole. *Heads* ½–¾ in. diam., rarely cylindric, often with two spreading leaves at the base; flowers imbricating, suberect, $\frac{1}{6}$ in. long, pale purple.

2. **A. axillaris,** *Benth. in DC. Prodr.* xii. 48; stems and leaves beneath pubescent, leaves small lower oblong upper orbicular many-nerved, heads axillary sessile.

ASSAM; *Jenkins, Mack.*

Stem slender, erect, simple, a foot long and upwards. *Leaves* in distant pairs, lower ¾ in., upper ¼ in.; nerves very strong beneath, forming salient parallel ribs. *Heads* ¼–⅓ in. diam.—A very singular plant, with the habit and ribbed leaves of a *Spermacoce*; the corollas have fallen away.

6. MOSCHOSMA, *Reichb.*

Herbs, annual or perennial. *Whorls* 6–10-fld., secund, in axillary and terminal panicled racemes, flowers very minute; bracts small. *Calyx* ovoid or campanulate, 5-toothed, fruiting declinate, upper or 3 upper teeth largest, margins not decurrent; throat naked. *Corolla-tube* very short; upper lip shortly 4-fid; lower entire with 4 flat lobes. *Stamens* 4, declinate, filaments free, toothless; anther-cells confluent. *Style* clavate-capitate, tip 2-fid. *Nutlets* compressed, smooth.—Species 6, Tropical Asiatic, African and Australian.

M. polystachyum, *Benth. in Wall. Pl. As. Rar.* ii. 13, *Lab.* 24, 708, and in *DC. Prodr.* xii. 48; nearly glabrous, stem acutely 4-angled, leaves long-petioled ovate long-acuminate coarsely serrate, racemes very slender. *Reichb. in Wall. Cat.* 2711; *Dalz. & Gibs. Bomb. Fl.* 204. Ocimum tenuiflorum, *Burm. Fl. Ind.* 129, *excl. syn. Rumph., not of Linn.* O. polystachyum, *Linn. Mant.* 567; *Roxb. Fl. Ind.* iii. 18. Plectranthus parviflorus, *Br. Prodr.* 506, *not of Willd.* P. micranthus, *Spreng. Syst.* ii. 691.

Wet places in BENGAL; Dacca, *Clarke.* DECCAN PENINSULA, BURMA and TENASSERIM. CEYLON.—DISTRIB. Java, China, Philippine Islands, Trop. Africa and Australia.

A very slender much-branched annual glabrate or puberulous herb, 2–3 ft.; angles of stem often scabrid. *Leaves* 1–2 in., very membranous, base cuneate, rounded or subcordate, quite entire, narrowed into a filiform petiole as long as the blade. *Racemes* 3–6 in.; peduncles and rachis filiform; whorls about 6-fld.; bracts minute, caducous; pedicels shorter than the calyx. *Flowers* $\frac{1}{16}$ in. long. *Fruiting calyx* $\frac{1}{12}$–$\frac{1}{10}$ in. *Corolla* flesh-coloured. *Nutlets* black, smooth, ellipsoid.

7. ORTHOSIPHON, *Benth.*

Under-shrubs or shrubs. *Whorls* 6- or fewer-fld., racemose. *Calyx* ovoid, campanulate or tubular, fruiting deflexed, upper tooth broad membranous, margins decurrent on the tube, lateral and lower distinct or shortly connate, usually subulate. *Corolla-tube* often slender, straight or incurved; upper lip 3–4-fid; lower entire, concave. *Stamens* 4, declinate, filaments free, toothless; anther-cells confluent. *Disc* usually gibbous. *Style* with a

minute capitate or clavate entire or notched stigma. *Nutlets* ovoid or orbicular, smooth or nearly so.—Species 16, tropics of the Old World.

* Calyx-throat villous. Stamens included.

1. **O. diffusus,** *Benth. in DC. Prodr.* xii. 50; woody, diffusely branched, viscidly tomentose, leaves ovate or elliptic obtuse crenate, corolla-tube shortly exserted, fruiting calyx $\frac{1}{8}$–$\frac{1}{4}$ in. Ocimum ? diffusum, *Benth. in Wall. Cat.* 2718, and in *Wall. Pl. As. Rar.* ii. 14. O. hirsutum, *Wall. Cat.* 2717 *in part.*

DECCAN PENINSULA; Pulney and Nilghiri Mts., in dry rocky places, *Klein*, &c. ? CEYLON; *Walker.*

Branches many and straggling from the woody stock, stout, cylindric, 6–8 in. high. *Leaves* $\frac{1}{2}$ in. long, tomentose on both surfaces, base rounded; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Racemes* 3–4 in., stout or slender; whorls rather distant, 2–4-fld., floral leaves minute. *Calyx* pubescent, throat with long hairs, fruiting ribbed, 2 lower lobes rigid, subulate. *Corolla* about $\frac{1}{4}$ in. long. *Nutlets* oblong, obscurely reticulate, brown, nearly smooth.—I suspect that the Ceylon habitat is an error.

VAR. *hispida*; tomentose or villous, branches longer more slender, leaves more narrowed at the base. O. hispidus, *Benth. l. c.*—Nilghiri and Cuddapah Hills.

** Calyx-throat naked. Stamens included.

† *Leaves petioled.*

2. **O. pallidus,** *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 70, *Lab.* 708, and in *DC. Prodr.* xii. 50; woody, diffusely branched, glabrous or finely pubescent, leaves petioled ovate obtuse coarsely toothed or crenate, two lowest calyx-teeth awned, corolla-tube about equalling the calyx. *Dalz. & Gibs. Bomb. Fl.* 205; *Boiss. Fl. Orient.* iv. 539. O. verticillatus, *Heyne in Herb. Rottl.* O. inodorus, *Koen.*; *Roxb. Ic. ined. in Herb. Kew, not of Fl. Ind.* iii. 19.

NORTH-WESTERN INDIA; from Kashmir and the Punjab to Behar, and southwards to Travancore.—DISTRIB. Beluchistan, Arabia.

Branches 6–12 in., many, ascending from a stout woody stock. *Leaves* $\frac{1}{2}$–2 in., obtuse or acute, scentless, base cuneate entire and narrowed into a petiole $\frac{1}{4}$–$\frac{1}{2}$ the length of the blade. *Racemes* long or short, stout or slender; floral leaves minute; flowers $\frac{1}{8}$ in. long. *Corolla* white. *Fruiting calyx* as long as the pedicel, $\frac{1}{4}$–$\frac{1}{3}$ in. long, deflexed; lower teeth subulate or aristate. *Nutlets* subglobose, compressed, pale, nearly smooth.—With difficulty distinguished from states of *Ocimum adscendens*, the calyx being nearly identical. Roxburgh's figure of *O. inodorus* is this plant, but his description refers to some other with cordate rugose leaves and cordate bracts.

3. **O. tomentosus,** *Benth. in Wall. Pl. As. Rar.* ii. 14, *Lab.* 27, and in *DC. Prodr.* xii. 51; tomentose, pubescent or glabrate, sometimes viscid, leaves petioled ovate, base rounded cuneate or cordate, racemes elongate, bracts ovate, 4 lower calyx-teeth awned, corolla from half as long to thrice as long as the calyx, tube subincurved, nutlets subglobose compressed pale brown nearly smooth.

DECCAN PENINSULA; on the Ghats, and from the Concan southwards. CEYLON.

A most variable plant. I am quite unable to find any characters whereby to define strictly the following forms. The *O. rubicundus* is distinguished by the long sessile or subsessile leaves.

VAR. *tomentosa* proper; 12–18 in., rarely more, pubescent or tomentose, leaves $\frac{1}{2}$–1 in., petiole half the length of the blade or less, corolla about $\frac{1}{3}$ in. long, twice as long as the calyx or less. O. tomentosus, *Benth. l. c.* ? O. triste, *Roth Nov. Sp.* 270. Plectranthus tristis, *Spreng. Syst.* ii. 690.—Nilghiri Hills.

VAR. *viscosa*; usually taller and stouter, viscidly pubescent or tomentose with spreading hairs, leaves 1–3 in., base often cordate, petiole slender, corolla ½–¾ in. twice or thrice as long as the calyx. O. viscosus, *Benth. in Wall. Cat.* 2723 and ll. c.—On the Ghats from Canara southwards.

VAR. *rubiginosa*, Clarke mss.; branches and leaves beneath clothed with a fine close rusty pubescence, leaves of var. *viscida*, flowers rather larger.—Nilghiris; *Wight, Clarke*, &c.

VAR. *glabrata*; usually more slender, quite glabrous or sparsely patently hairy, leaves 1–3 in., usually broadly ovate-cordate or base rounded coarsely toothed, petiole sometimes as long as the blade and very slender, corolla about ½ in., tube slender 2–3 times as long as the calyx. O. glabratus, *Benth. in Wall. Cat.* 2724, and ll. c.; *Dalz. & Gibs. Bomb. Fl.* 205; *Thwaites Enum.* 237. ? Ocimum thymiflorum, *Roth Nov. Sp.* 269. ? Plectranthus thymiflorus, *Spreng. Syst.* ii. 690. Ocimum glaucum, *Heyne in Herb. Rottl.* O. ascendens, *Wight*, and O. cordifolium, *Herb. Madr. in Wall. Cat.*—Common from the Concan southwards. Ceylon common. Thwaites remarks that this in Ceylon varies much in the size of the flowers. O. petiolaris, *Miquel*, of Java, with the habit of this, differs in the narrow bracts and form of the calyx.

VAR. *parviflora*; pubescent or glabrate, leaves ½–¾ in. ovate, calyx shorter broader, fruiting ⅙ in. long campanulate, corolla ¼ in. long very narrow, twice as long as the calyx. O. tomentosus, *var.* parviflora, *Benth. in DC. Prodr.* xii. 51.—Nilghiris; *Wight*, &c.—Probably a distinct species.

4. **O. incurvus,** *Benth. in Wall. Cat.* 2725, and in *Wall. Pl. As. Rar.* ii. 15, *Lab.* 28, and in *DC. Prodr.* xii. 52; puberulous, pubescent or tomentose, stem usually subsimple ascending 4-angled, leaves 3–6 in. petioled ovate or ovate-lanceolate coarsely crenate, bracts ovate, 2 lower calyx-teeth awned, corolla ½–1 in. straight or incurved, nutlets broadly ellipsoid compressed asperulous. *Hook. Bot. Mag.* t. 3847; *Maund Botanist.* iv. t. 173.

SUBTROPICAL HIMALAYA; Nepal, *Hamilton*; Sikkim (*Herb. Griff.*), *J. D. H.*, &c. KHASIA HILLS, alt. 3–4000 ft.; *Bruce, Masters*, &c.

Stem 1–3 ft., rarely branched. *Leaves* narrowed into winged petioles ½–3 in. long, rough or smooth above, sometimes of a fine purple beneath. *Calyx* in fruit ⅓ in.; lateral teeth triangular, hardly awned. *Corolla* pale pink, variable in size and curvature.—O. rubicundus, *Benth.*, consists of two plants, one of which with petioled leaves I refer to *O. incurvus*, the other with more lanceolate subsessile leaves is the true *rubicundus*, Bth.

VAR. *elata*; tall, branched, racemes densely tomentose, bracts larger longer than the pedicels.—E. Nepal, Tambur and Khabili rivers, alt. 4–6000 ft.; *J. D. H.*—A very large form with ovate-lanceolate leaves 4–7 in. long, scaberulous above and beneath. *Corolla* ½ in. long, tube slender.

5. **O. robustus,** *Hook. f.*; finely pubescent, stem robust terete, leaves 5–6 in. shortly petioled oblong-lanceolate subacute obscurely crenate, bracts ovate acute, 2 lower calyx-teeth awned, corolla 1 in.

ASSAM; Jyrung Hills, *Simons* (*Herb. Calcutt.*).

Whole plant when dried a dark rusty purple colour, clothed uniformly with a fine pubescence. *Stem* nearly as thick as a goose-quill. *Leaves* 2½ in. broad, base cuneate; petiole stout, ⅓–¾ in. *Racemes* stout, whorls rather distant. *Fruiting calyx* (unripe) ½ in. long.

†† *Leaves sessile, rarely petioled in* O. rubicundus.

6. **O. rubicundus,** *Benth. in Wall. Pl. As. Rar.* ii. 141, *Lab.* 26, and in *DC. Prodr.* xii. 57; erect, tomentose pubescent or glabrate, stems 4-angled, leaves ovate or ovate-lanceolate coarsely toothed, bracts minute, 4 lower calyx-teeth subulate, corolla twice as long as the calyx pubescent, nutlets

suborbicular compressed nearly smooth. *Wall. Cat.* 2721; *Hook. Ic. Pl.* t. 459. O. virgatus, *Benth. ll. c.*; *Wall. Cat.* 2722. Ocimum tuberosum, *Roxb. Fl. Ind.* iii. 18. Plectranthus rubicundus & virgatus, *Don Prodr.* 116. P. mollissimus, *Wall. mss.* P. amœnus, *Wall.* Lumnitzera rubicunda & virgata, *Spreng. Syst., Cur. post.* 223. Ocimum Miria, *Ham. in Wall. Cat.* 2722. O. rubicundum & virgatum, *Ham. mss.* O. mollissimum, *Wall. mss.* O. tuberosum, *Roxb. mss.*

WESTERN SUBTROPICAL HIMALAYA; from Central Nepal to Jamu, alt. 2–4000 ft. and southward to the Circars and Nilghiris. AVA; *Wallich.*—DISTRIB. Upper Burma.

Stem 1–2 ft., slender. *Leaves* 2–4 in., variable in breadth, and toothing obtuse or acute, base cuneate. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., white rose or pink, throat funnel-shaped. *Nutlets* punctulate.

VAR. *rigida*; leaves petiolate. O. rubicundus, *v.* rigida, *Benth. ll. c.* Ocimum rigidum, *Ham.*

VAR. ? *Hohenackeri*; smaller, laxly tomentose, leaves 1 in., corolla $\frac{1}{4}$ in., fruiting calyx smaller $\frac{1}{6}$ in.—Nilghiri Mts.; *Hohenacker*, n. 1394.—Possibly a distinct species, but the specimens are insufficient. The nutlets are as in *O. rubicundus.*

7. **O. comosus,** *Wight mss.*; *Benth. in DC. Prodr.* xii. 52; tomentose, shrubby, branches opposite terete leafy, leaves close set oblong or linear-oblong or obovate obtuse crenate, racemes sessile, bracts deciduous upper very large coloured, calyx tubular, lips subequal in length, 4 lower teeth subequal subulate. O. bracteatus, *Wight Ic.* t. 1428.

DECCAN PENINSULA; Shevagherry and Tinnevelly Hills, *Wight, Beddome.*

This differs greatly in habit from its congeners. Wight figures the stem as 4-angled, but they appear quite cylindric. *Branches* as thick as a crow-quill. *Leaves* $\frac{3}{4}$–1 in., rugose. *Rachis* of raceme stout; whorls 6-fld.; flowers suberect. *Calyx* nearly $\frac{1}{2}$ in., upper lip orbicular, straight. *Corolla* $\frac{3}{4}$–1 in., pubescent, tube very slender. *Nutlets* not seen.

*** Calyx-throat naked. Stamens far exserted.

8. **O. stamineus,** *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 29, and in *DC. Prodr.* xii. 52; slender, glabrous or pubescent, leaves petioled ovate acuminate coarsely toothed, base cuneate, calyx campanulate, 2 lower teeth subulate, corolla-tube thrice as long very slender, filaments capillary twice as long as the corolla. *Wall. Cat.* 2727; *Bot. Mag.* t. 5833; *Miquel Fl. Ind. Bat.* ii. 944. Ocimum grandiflorum, *Blume Bijd.* 835. O. longiflorum, *Ham. in Wall. Cat.* 2727.

ASSAM; *Jenkins.* BURMA and MARTABAN; *Wallich.* DECCAN PENINSULA; Anamallay Hills, *Wight.* NICOBAR ISLANDS.—DISTRIB. Malay and Philippine Islands, Australia.

Stem 1–2 ft., 4-angled. *Leaves* in distant pairs, 2–4 in., narrowed into the petiole. *Racemes* very lax-fld. *Calyx* $\frac{1}{6}$ in. *Corolla* 1 in., glabrous, white or purplish. *Nutlets* broadly oblong, compressed, rugulose.

9. **O. scapiger,** *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 28, and in *DC. Prodr.* xii. 52; glabrous, stem very short, leaves subradical petioled oblong obtuse coarsely crenate, racemes very long, calyx campanulate, 4 lower teeth subulate, corolla-tube short, throat funnel-shaped, filaments twice as long as the limb, nutlets oblong rugulose. *Wall. Cat.* 2726 (*scapigerum*).

NEPAL; *Wallich.*

Rootstock short, woody. *Leaves* 4–6 in., narrowed into a short or long slender petiole. *Racemes* 1 foot, strict, puberulous. *Calyx* $\frac{1}{4}$ in. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. long, blue; upper lip short, 4-toothed; lower longer, concave.

8. **PLECTRANTHUS,** *L'Herit.*

Herbs or undershrubs. *Flowers* usually small, in lax (rarely close) panicled or racemed 6–8-fld. cymes (whorls). *Calyx* 5-toothed, 2-lipped, enlarged in fruit. *Corolla-tube* exserted, long or short, straight or decurved, limb equal or gibbous or spurred, 2-lipped; upper lip usually short, broad, 3–4-fid recurved; lower much longer, entire, boat-shaped, narrow at the base or stipitate. *Stamens* 4, declinate; filaments simple, free; anther-cells usually confluent. *Disc* usually produced in front, and there equalling or exceeding the ovary. *Style* subequally 2-fid. *Nutlets* orbicular, ovoid or oblong, smooth, granulate or punctate.—Species about 80, Tropical and Sub-tropical Asiatic, African, Australian and Polynesian.

The species of the sections ISODON and COLEOIDES are numerous and very difficult of discrimination, and the latter should perhaps be referred to *Coleus*, or better still refer all the *Plectranthi* to sections of *Coleus*, of which genus *P. coleoides* and *urticifolius* have all the habit.

Sect. 1. **Isodon.** *Fruiting calyx* decurved, subequally 5-toothed, or 2-lipped, upper lip 3-toothed, lower 2-toothed. *Nutlets* oblong or rounded, obtuse.

* *Fruiting calyx broad, open, deeply* 2-*lipped, upper lip very broad with* 3 *distant spinous teeth, lower of* 2 *long subulate teeth. Corolla* 1 *in. long, tube straight, base equal.*

7598 1. **P. macranthus,** *Hook. f.*; sparsely hairy, leaves petioled ovate-lanceolate coarsely serrate, inflorescence racemose, flowers opposite.

SIKKIM HIMALAYA; Chola, alt. 6–8000 ft., *J. D. H.* KHASIA MTS., alt. 5–6000 ft.; *Lobb, J. D. H. & T. T.*, &c. BURMA; *Griffith.*

Stem 6–12 in., simple or branched, weak. *Leaves* 3–5 in., membranous. *Racemes* 6–12 in.; bracts ovate-lanceolate, persistent: pedicels $\frac{1}{4}$ in. *Corolla-tube* straight, 1 in. long, $\frac{1}{8}$ in. diam.; lips short, subequal, rounded. *Fruiting calyx* $\frac{1}{2}$ in. long. *Nutlets* globose, $\frac{1}{14}$ in. diam.—Very near the Japanese *P. longitubus*, Miq., and possibly a variety of it, but the cyme branches are much shorter and 1-fld.; the inflorescence being a simple raceme with opposite flowers.—Probably both should be referred to *Orthosiphon.*

** *Fruiting calyx longer than broad, distinctly* 2-*lipped for* $\frac{1}{3}$ *way down, upper lip subequally* 3-*toothed, lower* 2-*toothed. Corolla* $\frac{1}{6}$–$\frac{1}{3}$ *in. long, tube straight, base equal.* (It is not easy to distinguish this section from the next.)

2. **P. scrophularoides,** *Wall. Pl. As. Rar.* ii. 16, and *Cat.* 2738; tall, slender, nearly glabrous, leaves long-petioled ovate crenate, base cordate or cuneate, corolla-tube broad about twice as long as the lower lip, fruiting calyx with obtuse teeth, nutlets subglobose smooth. *Benth. Lab.* 40, and in *DC. Prodr.* xi. 55; *Hook. Ic. Pl.* t. 464 *in part.*

TEMPERATE HIMALAYA, alt. 8–1000 ft., from Kumaon to Sikkim; *Wallich*, &c.

Stem 2–4 ft. or more. *Leaves* 3–7 in., often as broad, sparsely minutely hairy; petiole 1–4 in. *Cymes* in broad open slender panicles. *Corolla* $\frac{1}{3}$ in., pale rose, tube nearly straight, upper lip very short, lower short, narrow, acute, hardly cymbiform. *Stamens* far exserted. *Fruiting calyx* $\frac{1}{4}$ in.—A much larger plant than *P. Gerardianus*, which it closely resembles. The figure in Icones Plantarum (copied from a drawing by Heyland of Paris) is, I suspect, made up of the magnified calyx and corolla of this, but of the leaves, panicle and nutlets of *P. Gerardianus.*

3. **P. pulneyensis,** *Hook. f.*; tall, robust, villous, lower leaves stoutly petioled ovate-cordate reticulate crenate, racemes narrow, branches short, corolla-tube short broad, lips short subequal, stamens far exserted, fruiting calyx $\frac{1}{6}$ in. sparingly hispid, lobes obtuse, nutlets broadly oblong. P. striatus, *Herb. Wight* 2096.

DECCAN PENINSULA; Pulney Mts., *Wight.*

Foliage, hairiness, and stout stems of *P. nilghiricus,* but flowers and fruit quite different.

4. **P. nigrescens,** *Benth. Lab.* 710, and in *DC. Prodr.* xii. 58; erect, finely pubescent, rarely subvillous, blackish when dry, leaves small petioled ovate or ovate-cordate crenate, cymes narrow usually terminal and solitary, corolla-tube short, lips subequal short, stamens shortly exserted or included, fruiting calyx sparsely scabrid, lobes obtuse, nutlets suborbicular. *Thwaites Enum.* 237, *excl. syn. P. Walkeri.* P. montanus, *Herb. Wight.* P. hians, and P. scabrellus, *Benth. in DC. l. c.* 57, 58.

CEYLON; Central Province, alt. 4–7000 ft., *Mackenzie,* &c.

Stem stout or slender, simple or branched, variable in pubescence. *Leaves* 1–1½ in. *Corolla* $\frac{1}{6}$ in., white, spotted with red. *Fruiting calyx* about as long.

5. **P. Walkeri,** *Arn. Pugill. Pl. Ind. Or.* 36, and in *Nov. Act. Nat. Cur.* xviii. 354; stems subsimple ascending leafy pubescent, leaves petioled lanceolate serrate above the middle glabrous, cymes terminal solitary narrow hoary, corolla-tube rather broad longer than the subequal lips, stamens shortly exserted, fruiting calyx nearly glabrous, lobes obtuse, nutlets broadly oblong. P. nigrescens, var. *Thwaites Enum.* 237.

CEYLON; Ramboddi, &c., alt. 4–5000 ft., *Sir G. Mackenzie, Walker.* DECCAN PENINSULA; Tinnevelly Hills, alt. 4000 ft., *Beddome.*

A very distinct plant, blackish when dry. *Stem* 12–18 in. *Leaves* 1½–2 in., acute, puberulous on the nerves. *Racemes* 2–5 in. *Calyx* nearly as in *P. nigrescens.*

6. **P. rivularis,** *Wight mss.*; stem erect leafy pubescent, leaves long-petioled lanceolate crenate to below the middle pubescent or glabrate, racemes terminal and axillary narrow pubescent, corolla-tube rather broad longer than the subequal lips, stamens shortly exserted, fruiting calyx nearly glabrous, lobes subacute, nutlets broadly oblong. P. nigrescens, β. scabrellus, *Wight* (Kew Distrib. 2093).

NILGHIRI and ANAMALLAY HILLS; Sispara, *Wight, Gardner, Beddome.*

Very near *P. Walkeri,* and perhaps a variety, but taller, more hairy, green when dry, leaves longer petioled, crenate (not serrate) to near the base.

*** *Fruiting calyx indistinctly* 2-*lipped, shortly* 5-*toothed. Corolla* $\frac{1}{8}$–$\frac{1}{3}$ *in. long, tube straight, equal at the base.*

7. **P. Gerardianus,** *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 40, and in *DC. Prodr.* xii. 56 (*all in part*); tall, branched, nearly glabrous, leaves large lower petioled ovate crenate or toothed, floral and bracts small, cymes in branched panicles, corolla $\frac{1}{3}$ in., tube subcylindric, lips subequal, fruiting calyx $\frac{1}{10}$ in. glabrous or nearly so, teeth subacute, nutlets ellipsoid. *Wall. Cat.* 2742. P. oblongifolius, *Wall. Pl. As. Rar.* ii. 16; *Cat.* 2739; *Benth. ll. c.*

TEMPERATE HIMALAYA, alt. 3–9000 ft.; from Kashmir to Sikkim (ascending to 12,000). KHASIA MTS., alt. 4–6000 ft.; *Wallich,* &c.

Stem 4–6 ft., glabrous or puberulous above. *Leaves* 3–7 by 1–4 in., acuminate,

membranous or rigid, sparsely scaberulous above or more so all over; base of lower narrowed into the long or short petiole. *Panicles* pyramidal, branches slender. *Flowers* white, speckled with pink. *Stamens* exserted.—I cannot distinguish *P. graciliflorus* by any sufficient character. *Hyssopus lophanthoides*, Ham., referred here by Bentham, is, according to an original specimen of Hamilton's, a different plant (see end of genus). *P. oblongifolius* is a diseased state with inflated barren calyces.

VAR. *graciliflora*; leaves more scabrous above, and usually red-brown when dry. P. graciliflora, *Benth. in DC. Prodr.* xii. 56. P. Gerardianus, *var.* hispida, *Herb. Ind. Or. H. f. & T.*—Nepal, Sikkim, and Khasia Mts.

VAR. *brachyantha*; corolla-tube very short and wide, scarcely exceeding the calyx. —Khasia Mts.; Churra, alt. 4000 ft., *J. D. H. & T. T.* Sikkim, alt. 5–8000 ft., *Clarke, J. D. H.* Prome Hills, *Benson* (in *Herb. Maingay*).—A dubious plant, referred by Clarke (mss.) to *P. striatus*, which small specimens resemble. Fruiting calyx not seen.

8. **P. striatus,** *Benth. in Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 56; stem usually 6–12 in. glabrous pubescent or subvillous, leaves small lower petioled broadly ovate crenate, cymes panicled, corolla-tube broad or narrow short or tubular, fruiting calyx $\frac{1}{12}$ in. hispid, teeth obtuse, nutlets oblong. *Wall. Cat.* 2740.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–8000 ft., *Wallich*, &c. KHASIA MTS., alt. 3–6000 ft., common.

The usually much smaller size, shorter broader leaves, more flaccid habit, and hispid calyx best distinguish this from *P. Gerardianus*, but there are many specimens that I am in doubt about. The corolla is very variable, and the stamens are normally far exserted.

9. **P. Stracheyi,** *Benth. mss.*; stem simple ascending puberulous, leaves 4–5 in. short-petioled narrowly lanceolate serrate above the middle, cymes in a terminal narrow panicle.

WESTERN HIMALAYA; Kumaon, in the Surja valley, alt. 4500 ft., *Strachey & Winterbottom*.

Flowers of *P. Gerardianus*, but very distinct in foliage and habit, which resemble *P. Walkeri*. The fruit is not ripe. A very similar but more flaccid plant (specimens without corolla and fruit), and with longer petioles, is found in Pegu by Dr. Brandis.

10. **P. hispidus,** *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 41, and in *DC. Prodr.* xii. 57; stout, erect, scaberulous, densely pubescent or villous, leaves subsessile ovate crenate or serrate tomentose beneath, corolla tubular pubescent, lower lip much longer than the upper, fruiting calyx $\frac{1}{12}$ in. densely villous, nutlets very minute ellipsoid. *Wall. Cat.* 2741.

KHASIA MTS., alt. 4000 ft.; *Wallich*, &c.

Like a robust and (usually) densely woolly form of *P. Gerardianus*, with a very minute woolly calyx. *Flowers* white, speckled with red.

11. **P. Stocksii,** *Hook. f.*; slender, simple or branched, glabrous or sparsely hairy, leaves petioled ovate or ovate-cordate crenate membranous, panicles pyramidal, corolla-tube short broad, fruiting calyx $\frac{1}{10}$ in. scaberulous, teeth subacute, nutlets broadly oblong. P. striatus & Concan, *Herb. Ind. Or. H. f. & T.* P. Wightii, *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl.* 205.

DECCAN PENINSULA; the Concan, *Stocks*, *Law*, &c.; Bababoodan Hills, *Heyne in Herb. Rottler*; Belgaum, at Purwar Ghat, *Ritchie*.

Possibly a form of *P. striatus*, but is a larger plant. Small specimens from the Kala Nuddi (banks above Saopa), from Ritchie, have very minute fruiting calyces. Heyne's specimen is a very small one, but, I think, of this species.

12. **P. Wightii,** *Benth. Lab.* 41, and in *DC. Prodr.* xii. 56; tall, robust, branched, glabrous or scaberulous, leaves petioled broadly ovate or cordate crenate-toothed rather rigid, cymes lax-fld. often leafy, large pyramidal panicles, corolla-tube short broad, fruiting calyx $\frac{1}{10}$–$\frac{1}{8}$ in. scaberulous, teeth obtuse, nutlets oblong. *Wight Ic.* t. 1429.

NILGHIRI and PULNEY MTS., alt. 1–7000 ft.; *Wight*, &c.
The var. *macrophylla*, Benth., is only a larger-leaved specimen.

13. **P. nilghiricus,** *Benth. in DC. Prodr.* xii. 57; villous, stem very robust, leaves thick stoutly petioled broadly ovate-cordate rugose crenate, cymes in pyramidal panicles, flowers rather crowded, corolla tubular, lobes pubescent, fruiting calyx $\frac{1}{12}$ in. densely woolly, nutlets suborbicular. ? P. bullatus, *Benth. l. c.*

NILGHIRI and ANAMALLAY MTS.; *Sir F. Adams, Wight, Beddome.*
Apparently a very distinct species. Whole plant yellowish-brown when dry. *P. bullatus*, Benth., may be the same thing; I have seen no authentic specimens of it.

14. **P. capillipes,** *Benth. in DC. Prodr.* xii. 57; annual, small, softly pubescent, rather slender, leaves small petioled ovate or cordate crenate, cymes in narrowly pyramidal panicles, corolla tubular, lips subequal lower very small, fruiting calyx $\frac{1}{10}$ in. puberulous, teeth obtuse, nutlets oblong. *Thwaites Enum.* 237.

CEYLON; Central Province, alt. 3–5000 ft., *Walker*, &c.
Habit of *P. striatus*, which small specimens resemble, whilst larger ones approximate to *P. Wightii*. *Corolla* white, with pink spots on upper lip. *Stamens* exserted.

15. **P. nepetæfolius,** *Benth. in DC. Prodr.* xii. 57; villous with soft spreading hairs, stem 1–2 ft. simple, leaves petioled ovate-cordate crenate soft and softly hairy on both surfaces, cymes in narrowly pyramidal panicles, corolla tubular, lips subequal, fruiting calyx $\frac{1}{8}$ in. pubescent, teeth obtuse, nutlets ovoid-oblong.

DECCAN PENINSULA, *Wight, Perrottet*; Nilghiri and Anamallay Hills, *Beddome.*
A much smaller plant than *P. Wightii*, clothed with long hairs, and with a tubular corolla $\frac{1}{4}$ in. long.

**** *Fruiting calyx longer than broad, 2-lipped or subequally 5-toothed. Corolla $\frac{1}{6}$–$\frac{1}{3}$ in., tube declinate or abruptly decurved* (except *P. repens*), *base usually gibbous.*

16. **P. repens,** *Wall. Pl. As. Rar.* ii. 17, and *Cat.* 2746; pubescent or villous, stem short, leaves long-petioled broadly ovate- or orbicular-cordate obtuse crenate, cymes in narrow racemes which are longer than the stem, corolla-tube nearly straight cylindric obtusely spurred at the base above, stamens included, fruiting calyx scaberulous, teeth short obtuse, nutlets very minute broadly oblong. *Benth. Lab.* 43, and in *DC. Prodr.* xii. 58.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–9000 ft., *J. D. H., Clarke.*
Stem 4–6 in., prostrate below. *Leaves* 1½–3 in. broad, membranous; petiole 1–3 in. *Panicles* solitary and terminal, or few axillary, 1 foot long and under, lax fld. *Corolla* $\frac{1}{6}$ in. *Fruiting calyx* $\frac{1}{12}$ in.—The corolla is not like that of *P. Coetsa*, nor are the calyx-teeth lanceolate and acute (as described in DC. Prodr.).

17. **P. Coetsa,** *Ham. in Don Prodr.* 117; tall, erect, branched, pubescent

or glabrate, leaves ovate crenate narrowed into the winged petiole, cymes in lax-fld. panicled racemes, corolla-tube much shorter than the large saccate lower lip, fruiting calyx narrow shortly 2-lipped, teeth acute, nutlets oblong or subglobose. *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 42, and in *DC. Prodr.* xii. 58 (excl. syn. Burm.); *Wall. Cat.* 2743. Ocimum Coetsa, *Spreng. Syst., Cur. post.* 223.

TEMPERATE and SUBTROPICAL HIMALAYA; from Murree to Mishmi, alt. 3–8000 ft., abundant. KHASIA MTS., alt. 3–5000 ft.; Burma, *Wallich.*

A tall strong-smelling 6–8 ft. undershrub. *Leaves* 1–3 in. *Cymes* very numerous, branchlets subsecund. *Corolla* $\frac{1}{6}$ in., lavender-blue; upper lip very short. *Stamens* included in the lower lip. *Fruiting calyx* $\frac{1}{10}$–$\frac{1}{8}$ in., hoary or scaberulous. *Nutlets* apparently variable.

VAR. *Hookeri*; tall, leaves sometimes 5 in. glabrous or puberulous, fruiting calyx larger $\frac{1}{4}$–$\frac{1}{3}$ in. very broad, teeth longer more acute, nutlets twice as large. *Plectranthus* no. 15, Herb. Ind. Or. H. f. & T. *P. Hookeri*, Clarke mss.—Khasia Mts.; Moflong, alt. 5000 ft., *J. D. H. & T. T.*

18. **P. menthoides,** *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 42, and in *DC. Prodr.* xii. 59; tall, erect, branched, hoary pubescent or tomentose, leaves petioled ovate crenate narrowed into the winged petiole, cymes in long racemes dense or lax-fld., corolla short, tube about as long as the saccate lower lip, fruiting calyx hoary, teeth subequal subacute, nutlets oblong. *Wall. Cat.* 2744. P. Macraei, *Benth. Lab.* 42, and in *DC. l. c.*; *Wight Ic.* t. 1430. P. rugosus, β. tomentosus, *Benth. in Wall. l. c.* ii. 17; *Wall. Cat.* 2745 B. P. Coetsa, *Thwaites Enum.* 237. Scutellaria japonica, *Burm. Fl. Ind.* 130.

SOUTH DECCAN PENINSULA, from Belgaum southward; Nilghiri and Pulney Mts., by wet ditches, *Wight.* CEYLON; Central Province, alt. 4–6000 ft.

The southern representative of *P. Coetsa*, and probably only a variety of that plant. The length of the corolla-tube is variable, as is the pubescence of the leaves.

19. **P. Maddeni,** *Benth. in Strach. Cat. Pl. Kumaon*, 86; stout, erect, branched, nearly glabrous, leaves ovate crenate narrowed into the winged petiole, cymes in lax- or dense-fld. racemes, corolla-tube much shorter than the saccate lower lip, fruiting calyx broadly campanulate glabrous, teeth obtuse, nutlets subglobose.

TEMPERATE HIMALAYA; Kumaon, alt. 7–8500 ft., *Strachey & Winterbottom, Duthie*; Sikkim, alt. 5–10,000 ft., *J. D. H.*

Very near *P. Coetsa*, and perhaps a form of it, but more glabrous, with broader fruiting calyces, which have obtuse teeth and more rounded nutlets.

20. **P. melissoides,** *Benth. Lab.* 39, and in *DC. Prodr.* xii. 62; herbaceous, erect, tomentose or puberulous, leaves small sessile or shortly petioled ovate or rounded crenate, cymes in lax-fld. slender racemes, corolla-tube short broad, fruiting calyx 2-lipped subhispid, teeth acute, nutlets globose. *Wall. Cat.* 7122.

KHASIA MTS., alt. 4–6000 ft.; *Wallich, Mack, Griffith, H. f. & T*, &c.

Stem 1–2 ft., rather slender, strict. *Leaves* $\frac{1}{2}$–1 in., glabrate or very tomentose beneath or on both surfaces, narrowed into the short petiole. *Racemes* long, slender, strict. *Corolla* $\frac{1}{4}$ in., pink; lips short, gibbously hemispheric. *Fruiting calyx* $\frac{1}{4}$ in., broadly campanulate.

21. **P. rugosus,** *Wall. Pl. As. Rar.* ii. 17, and *Cat.* 2745; shrubby, erect, hoary with stellate down, leaves small petioled ovate or elliptic obtuse crenate rugose above beneath densely white-tomentose, cymes axillary lax-

fld. panicled, corolla-tube very short, lips very large, fruiting calyx hoary, teeth subequal acute, nutlets oblong. *Benth. Lab.* 43, and in *DC. Prodr.* xii. 59, var. *a.*; *Gamble Ind. Timbers*, 300.

WESTERN HIMALAYA; dry hills from Kashmir to Garwhal, alt. 3–8000 ft. BHOTAN; *Griffith.* MARWAR; on Mt. Abo, *Stocks.*—DISTRIB. Affghanistan.

A shrub; branches slender, strict. *Leaves* 1 in. and less, leathery, finely reticulate above; base subcordate, rarely acute; petiole slender. *Cymes* in leafy racemes, with slender peduncles and pedicels. *Corolla* $\frac{1}{8}$ in., white, with rose or purple spots; lips much longer than the tube, lower longest. *Fruiting calyx* $\frac{1}{8}$ in. long, very shortly 2-lipped.

Sect. 2. **Pyramidium.** *Fruiting calyx* erect, tubular, equally 5-toothed. *Corolla-tube* decurved, base gibbous. *Nutlets* trigonous, ovoid-oblong, acuminate.

22. **P. ternifolius,** *Don Prodr.* 117; robust, densely white-tomentose, leaves opposite and ternately whorled subsessile lanceolate acuminate serrate rugose, cymes in dense long white villous panicles, corolla very short villous, fruiting calyx cylindric, teeth subequal. *Wall. Cat.* 2748; *Benth. in Lab.* 44; *in Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 61; *Hook. Ic. Pl.* t. 460. Ocimum ternifolium, *Spreng. Syst., Cur. post.* 224.

TROPICAL HIMALAYA; from Kashmir to Bhotan, alt. 0–4000 ft. KHASIA MTS., alt. 0–3000 ft. BENGAL, ASSAM. BEHAR, at Parusnath, *J. D. H.*—DISTRIB. Burma, S. China.

A bush, 3–5 ft., with strict erect branches. *Leaves* 3–7 in., thick, rugose, base acute. *Panicles* cylindric, white; lower bracts leafy; flowers subsessile, densely crowded. *Corolla* white, with pink spots at base of upper lip; tube inflated, and lips very short. *Stamens* included. *Fruiting calyx* $\frac{1}{6}$–$\frac{1}{4}$ in., straight, erect; teeth rounded. *Nutlets* trigonous, acuminate.

Sect. 3. **Coleoides.** *Fruiting calyx* 2-lipped, upper lip large, rounded, reflexed, very shortly 2-toothed or entire; lower with 3 acute, awned, or subulate pointed teeth. *Corolla-tube* deflexed or declinate, base gibbous or not.

23. **P. incanus,** *Link Enum. Hort. Berol.* ii. 120; herbaceous, pale, hoary, stem subsimple, leaves large long-petioled broadly ovate-cordate crenate, cymes lax-fld. racemose, corolla-tube short longer than the short hemispheric lower lip, base not gibbous, fruiting calyx broadly campanulate, lower lip longest, teeth with long points, nutlets large subglobose. P. cordifolius, *Don Prodr.* 116; *Benth. Lab.* 35, *in Wall. Pl. As. Rar.* ii. 16, and in *DC. Prodr.* xii. 66; *Wall. Cat.* 2736; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl.* 205. P. secundus, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 20. P. divaricatus, *Weinm. in Syll. Pl. Soc. Ratisb.* i. 68, and in *Flora*, 1826, 174. P. mollis, *Spreng. Syst.* ii. 690. Ocimum molle, *Ait. Hort. Kew*, ii. 322. O. mayporense, *Roth Nov. Sp.* 271.—*Rheede, Hort. Mal.* x. t. 84.

Hills of CONTINENTAL INDIA, from the HIMALAYA (Simla to Sikkim), ascending to 5500 ft., KHASIA MTS. and CENTRAL INDIA, to the ANAMALLAYS. (Absent in Ceylon and in the Malay Peninsula.)

Whole plant usually hoary with very fine pubescence. *Stem* robust below. *Leaves* 2–4 in., sometimes as broad; petiole as long or longer than the blade. *Corolla* $\frac{1}{4}$ in. long, slightly decurved, white pubescent. *Stamens* included. *Fruiting calyx* $\frac{1}{3}$ in. *Nutlets* $\frac{1}{12}$ in. diam.—Lower lip of corolla longest of any Indian species.

24. **P. subincisus,** *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 36, and in *DC. Prodr.* xii. 66; glabrous or puberulous, stem short branched, leaves long petioled orbicular ovate obtuse sinuate-crenate, corolla very small, tube

slender decurved longer than the short lower lip, fruiting calyx campanulate, lips short upper rounded, teeth of lower with subulate tips, nutlets globose smooth or rugose. *Wall. Cat.* 2737.

DECCAN PENINSULA; near Courtallum and Dindigul, *Herb. Rottler, Wight.* CEYLON (var. *Gardneri*).

Stem a foot high, flaccid, vaguely branched. *Leaves* 1½–2 in. long and broad, flaccid; petiole as long. *Corolla* ⅛ in. long, pubescent. *Fruiting calyx* dimorphic, larger ⅛ in., with deeply pitted brown nutlets; smaller ⅛ in., with smooth pale nutlets.—The specimens in Wallich's, Wight's, and Rottler's Herbaria are very imperfect.

VAR. *Gardneri*; leaves narrowed into the petiole, purplish when dry. P. Gardneri, *Thwaites Enum.* 237.—Ceylon; Central Province, Adam's Peak, &c., *Walker,* &c.

25. **P. Parishii,** *Hook. f.*; annual, puberulous, flaccid, branched, leaves orbicular-ovate narrowed into the very long petiole coarsely crenate or lobulate, cymes in lax-fld. racemes, corolla ⅔ in., tube very slender with the inflated throat much longer than the narrow lip.

TENASSERIM; Moulmein, *Parish.*

Stem succulent, 6–10 in. *Leaves* 2 in. long and broad, membranous, obtuse. *Calyx* minute in flower; peduncles and pedicels pubescent; lower lip with subulate teeth. *Corolla* with pale blue lower lip. *Fruiting calyx* ⅛ in., broadly campanulate, subequally very shortly 2-lipped; upper lip triangular, tip subulate; teeth of lower similar but narrower. *Nutlets* very pale.—I have but one specimen of this very distinct species.

26. **P. zeylanicus,** *Benth. Lab.* 36, and in *DC. Prodr.* xii. 66; tall, slender, densely finely glandular-pubescent, leaves shortly petioled orbicular-cordate crenate, flowers minute whorled in very long slender racemes, corolla-tube longer than the short lower lip, fruiting calyx minute subspheric, upper lip rounded mucronate, teeth of lower subulate.

CEYLON; Central Province, at Ramboddi, *Gardner.* (Commonly cultivated in native gardens as a medicine, unknown wild, *Thwaites.*)

Stem 2–3 ft., stout, succulent, naked. *Leaves* in few pairs, 1–4 in. diam., rather thick. *Racemes* 6–12 in., very narrow; flowers in 6–10-fld. whorls on the main rachis; pedicels ¼ in. *Corolla* ⅓ in. long, slightly curved, tube hardly gibbous at the base. *Fruiting calyx* $\frac{1}{10}$ in., densely glandular-pubescent like the whole raceme. *Nutlets* not seen.

27. **P. coleoides,** *Benth. in DC. Prodr.* xii. 64; very stout, branched, glandular-tomentose or glabrate, leaves long-petioled ovate or orbicular-ovate crenate obtuse, flowers racemed on the branches of a pyramidal densely glandular-tomentose panicle, corolla pubescent, tube about equalling the lower lip, upper lip of fruiting calyx rounded, teeth of lower lanceolate acuminate, nutlets oblong black shining. *Bot. Mag.* t. 5841; *Saunders Refug. Bot.* t. 256. Coleus Wightii, *Benth. Lab.* 58, and in *DC. Prodr.* xii. 78; *Wight Ic.* t. 1433. C. glabratus, *Benth. Lab.* 58, and in *DC. l. c.* C. paniculatus, *Benth. in Wall. Plant. As. Rar.* ii. 79; *Wall. Cat.* 2734, and in *DC. l. c.*

NILGHIRI and ANAMALLAY MTS.; ascending to 7000 ft. in moist places, *Wight, Perrottet,* &c.

Stem 2–3 ft., succulent. *Leaves* 1–4 in. diam., fleshy; petiole as long as the blade. *Panicles* thyrsiform, sometimes 1 foot across the lower branches. *Corolla* ½ in. long, lilac; lower lip ciliate. *Stamens* included. *Fruiting calyx* very variable, broad straight and campanulate, or narrowed and curved.

28. **P. urticifolius,** *Hook. f.*; very robust, glabrous except the

puberulous panicle, leaves very large stoutly petioled broadly ovate obtusely acuminate, margin regularly obtusely lobulate, lobules crenate, cymes in stout branched panicles, corolla-tube equalling the narrow lower lip, fruiting calyx large, upper lip orbicular ovate, teeth of lower subulate-lanceolate, nutlets large orbicular oblong brown shining. Coleus urticifolius, *Benth. in DC. Prodr.* xii. 78.

DECCAN PENINSULA; Courtallum, *Wight*; Tinnevelly Hills, alt. 4500 ft., *Beddome.*

Stem short. *Leaves* 3–6 in. long and nearly as broad, sometimes minutely puberulous above, gland-dotted beneath, lobules rounded or ovate; petiole 2–3 in., very thick. *Panicle* very large; branches suberect; flowers racemed or corymbose. *Flowers* ⅜ in. long. *Corolla-tube* cylindric, decurved; lips subequal, upper very broad, lower narrowly cymbiform. *Stamen* quite free. *Fruiting calyx* ⅓ in. long, 2 lowest teeth longest, incurved. *Nutlets* large.—Near *P. coleoides.*

29. **P. fruticosus,** *Wight Cat.* 2524; very robust, shrubby, branches and leaves beneath densely tomentose, leaves large rounded ovate or cordate obtusely acuminate coarsely crenate, flowers secundly racemed on the erect branches of a dense stout glandular-pubescent thyrsus, corolla decurved. Coleus fruticosus, *Benth. in DC. Prodr.* xii. 78.

DECCAN PENINSULA; Pulney Mts., *Wight.*

Stem as thick as the middle finger, spongy. *Leaves* 3–5 in. long and broad, pubescent above, margin sublobulate; petiole 1–2 in., very stout, almost woolly. *Panicle* 6–10 in., rachis and primary branches woody, ultimate 1–3 in., flexuous, many-fld.; flowers alternate, shortly pedicelled. *Corolla* pubescent, ⅜ in. long. *Filaments* quite free. *Upper calyx-lip* ovate, teeth of lower acuminate.—A very robust well-marked species. The fruit is not ripe.

30. **P. Griffithii,** *Hook. f.*; erect, branched, hirsutely tomentose, leaves petioled ovate acuminate toothed or crenate, cymes very short in long slender narrow racemes, corolla-tube very slender longer than the lower lip, fruiting calyx sparsely hairy, upper lip broad rounded, teeth of lower acuminate, nutlets orbicular smooth black shining.

EASTERN ASSAM; Mishmi Hills, *Griffith.*

Stem rather woody, tomentose; branches, racemes and leaf nerves beneath with long hairs amongst the tomentum. *Leaves* 3–5 in., hirsute on both surfaces, base rounded, shortly cordate at the insertion of the ½–1½ in. long petiole. *Racemes* 6–10 in., ¾ in. diam., leafless, rather dense-fld., rachis very hirsute; cymes short, sessile, with pedicelled flowers. *Corolla* ⅙ in. long, tube declinate, curved, white, lips subequal, pale rose-coloured. *Fruiting calyx* ⅙ in., contracted above the swollen base, mouth campanulate, lips subequal in length.

31. **P. crenulatus,** *Hook. f.*; erect, densely finely tomentose throughout, leaves petioled ovate acute crenulate, cymes short in axillary racemes, fruiting calyx hairy, upper lip broad rounded, teeth of lower acuminate, nutlets orbicular black granulate opaque.

UPPER ASSAM; Namroop, *Griffith.*

Very near *P. Griffithii*, but not at all hirsute, leaves similar in shape but less acuminate, and crenatures smaller, racemes shorter and nutlets opaque and granulate. *Flowers* not seen.

32. **P.? Helferi,** *Hook. f.*; stem woody below and branches and young leaves finely puberulous, leaves shortly petioled lanceolate subacute crenate above the entire base glabrous, cymes short subsessile in branched glandular-tomentose racemes, upper lip of glandular-hairy fruiting calyx orbicular, teeth of lower subulate.

TENASSERIM; *Helfer.*

Stem 1–2 feet. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., narrowed into the petiole, rather coriaceous, nerves oblique. *Fruiting calyx* $\frac{1}{6}$ in. *Corolla* and *nutlets* not seen.—The specimens are hardly fit for description, but the species is too remarkable to be passed over.

DOUBTFUL SPECIES.

P. PATCHOULI, *Clarke mss.*; tall, erect, branched, hirsutely tomentose, leaves petioled ovate-cordate crenate-toothed, cymes branched, flowers subsecundly subsessile on the branchlets of a loose panicle, calyx-teeth subequal, corolla-limb subclavate with a large incurved cymbiform obtuse lower lip and shorter narrow upper lip.

ASSAM; *Jenkins* (Herb. Calcutt.). KHASIA MTS.; Johra, alt. 4000 ft., cult., *Clarke.*

Stem stout, branched. *Leaves* 2–3 in., hairy on both surfaces. *Cymes* panicled, irregularly branched; bracts small, leafy; pedicels $\frac{1}{10}$ in. or 0. *Calyx* hardly 2-lipped, teeth acute. *Corolla* $1\frac{1}{2}$ in., tube slender, upper lip much shorter and narrower than the saccate obtuse lower, which is much larger than the tube.—"This, I am told, is the true Patchouli plant, and has the true scent, which *Pogostemon Patchouli* has not." *C. B. Clarke.* I have seen no fruit, and the inflorescence is very peculiar; it may not be a *Plectranthus.*

P.? MONTANUS, *Benth. in Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 60; *Wall. Cat.* 2747; densely tomentose, stem short very robust, leaves shortly petioled ovate or rounded crenate very thick rugose, racemes dense-fld. pyramidate, branches very thick ascending, whorls close set but not confluent, flowers sessile or pedicelled, calyx $\frac{1}{10}$ in. hemispheric with 5 triangular subacute teeth, nutlets suborbicular polished pale.—Mysore; at Nundydroug, *Klein, Herb. Rottler.*—Habit of *P. coleoides,* but calyx very different. The specimens are very imperfect, and have no corolla.

HYSSOPUS LOPHANTHOIDES, *Ham. in Don Prodr.* 110, referred to *P. Gerardianus* by Bentham, can hardly be that plant; a specimen of it from Hamilton more resembles *P. striatus,* being very pubescent. It may, however, be a hairy form of *P. Gerardianus.*

OCIMUM DENSIFLORUM, *Roth Nov. Sp.* 275, doubtfully referred by Bentham to *P. rugosus,* must be a very different plant, according to the description.

P. ROTUNDIFOLIUS, *Spreng. Syst.* ii. 690; *Benth. Lab.* 34, and in *DC. Prodr.* xii. 65; *Grah. Cat. Bomb. Pl.* 148. Coleus? rugosus, *Benth. in Wall. Pl. As. Rar.* ii. 15. Germania rotundifolia, *Poir. Dict.* ii. 763. Nepeta madagascariensis, *Lam.*? *Dict.* i. 712.—Kurka, *Rheede Hort. Mal.* xi. t. 25?—A reputed native of Mauritius and Coromandel? The last habitat is no doubt founded on the supposed identity of the Mauritian with the plant figured by Rheede, which represents a flowerless tuberiferous herb which has not been identified. Local botanists should be able to discover what Rheede's plant is.

9. **COLEUS,** *Lour.*

Characters of *Plectranthus,* but filaments combined below into a sheath around the style.—Species about 50, Tropical African and Asiatic, and one Australian.

* *Calyx-throat villous within.*

1. **C. spicatus,** *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 49, and in *DC. Prodr.* xii. 71; stem very stout villous with long spreading hairs or glabrate, leaves subsessile obovate ovate or orbicular glabrous fleshy entire or crenate, floral large concave deciduous, whorls in a dense cylindric spiciform villous thyrse, upper calyx-lip very broad truncate. *Wight Ic.* t. 1431; *Wall. Cat.* 2729. C. Heynii, *Benth. Lab.* 50, and in *DC. l. c.* C. Zatarhendi, *Dalz. & Gibs. Bomb. Fl.* 206; ? *Benth. Lab.* 50. Plectranthus

monadelphus, *Heyne mss.*; *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 22. P. caninus, *Roth Nov. Sp.* 279. Ocimum monadelphum, *Roth l. c.* 267. ? O. Zatarhendi, *Forsk. Fl. Æg. Arab.* 109.

SOUTH DECCAN; on low rocky hills, common.

Stem 6–12 in., simple or branched. *Leaves* few, very variable, $\frac{1}{2}$ by $3\frac{1}{2}$ in. *Spikes* 4–8 in. by $\frac{1}{2}$—$\frac{2}{3}$ in. diam.; bracts broad, acute, ciliate; flowers $\frac{1}{2}$ in. long; upper calyx-lip crenulate, teeth of lower acute. *Corolla-tube* slender, bent above the middle; upper lip 4-lobed, lower boat-shaped.

2. **C. barbatus,** *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 49, and in *DC. Prodr.* xii. 71; stem stout villous with long hairs, leaves petioled ovate or obovate obtuse crenate villous or hispid, floral ovate deciduous, whorls distant, upper calyx-lip rounded ovate acute. *Wall. Cat.* 2728; *Grah. Cat. Pl. Bomb.* 148; *Dalz. & Gibs. Bomb. Fl.* 205; *Wight Ic.* t. 1432. C. Schimperi, *Vatke in Linnæa*, xxxvii. 320. Plectranthus barbatus, *Andr. Bot. Rep.* t. 494. P. comosus, *Bot. Mag.* t. 2318. P. Forskohlii, *Willd. Sp. Pl.* iii. 169; *Bot. Mag.* t. 2036. P. asper, *Spreng. Syst.* ii. 690. P. mysorensis, *Heyne mss.* Germania Forskohlii, *Poir. Dict.* ii. 764. Ocimum asperum, *Roth Nov. Sp.* 268. O. cinereum, *Brown in Salt. Abyss. App.* O. saccharoides, *Willd. fid. Heyne.*

SUBTROPICAL HIMALAYA; Nepal and Kumaon, ascending to 8000 ft. BEHAR; top of Parusnath, *Thomson.* DECCAN PENINSULA; common. CEYLON; Oovah district, alt. 3–5000 ft.—DISTRIB. Tropical E. Africa.

Stem 1–2 ft., ascending, branched. *Leaves* 3–5 in., narrowed into the petiole. *Racemes* 6–12 in., stout; flowers $\frac{3}{4}$—1 in. *Corolla* pale blue, much like *C. spicatus.* *Fruiting calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., upper lip acuminate, teeth of lower subulate, all pungent.

** *Calyx-throat glabrous within.*

3. **C. aromaticus,** *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 51, and in *DC. Prodr.* xii. 72; shrubby below, hispidly villous or tomentose, leaves petioled broadly ovate or cordate crenate fleshy, floral minute, whorls distant densely many-fld., upper calyx-lip ovate acute membranous, lower acuminate. *Wall. Cat.* 2730; *Wight Ill.* ii. t. 175; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl. Suppl.* 66; *Bot. Reg.* t. 1520. C. amboinicus, *Lour. Fl. Coch.* 372. C. crassifolius, *Benth. in Wall. Pl. As. Rar.* ii. 13, and *Lab.* 52; *Wall. Cat.* 2731. Plectranthus aromaticus, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 22.

Cultivated throughout INDIA, CEYLON and various tropical countries.

Stem 1–3 ft., fleshy. *Leaves* 1–2 in., very aromatic. *Flowers* shortly pedicelled, $\frac{1}{3}$ in. long. *Corolla* pale purplish, tube short, throat inflated, lips short. *Stamens* shortly exserted. *Fruiting calyx* suberect.—Roxburgh describes the flowers as blue. *C. amboinicus* is the earliest name, but not very appropriate.

4. **C. parviflorus,** *Benth. in DC. Prodr.* xii. 72; stem stout fleshy, roots tuberous, leaves petioled rounded-ovate obtuse coarsely crenate glabrous or nearly so, whorls subdistant slender pubescent, racemes laxly many-fld., upper calyx-lip ovate, teeth of lower obtuse or lowest mucronate. ? C. tuberosus, *Benth. Lab.* 59 (Plectranthus tuberosus, *Blume*).

DECCAN PENINSULA; Quilon and Panpanassum, *Wight.* CEYLON, cultivated, *Gardner.*

Stem 1–2 ft. *Leaves* $1\frac{1}{2}$–2 in., often as broad, base cuneate or subcordate. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla* decurved, lips short. *Stamens* included. *Fruiting calyx* not seen.—Probably *C. tuberosus,* which is cultivated for its tubers in Java as this is in Ceylon, but Blume describes the Javan plant as having quite entire leaves.

5. **C. scutellarioides,** *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 53, and in *DC. Prodr.* xii. 73; tall, slender, glabrous or minutely hairy, leaves petioled ovate or ovate-lanceolate acuminate crenate membranous, whorls in distant slender puberulous racemes laxly many-fld., upper calyx-lip ovate, lateral teeth of lower obtuse, lowest acute. *Wall. Cat.* 2732. Ocimum scutellarioides, *Linn.*; *Burm. Fl. Ind.* 130; *Bot. Mag.* t. 1446. Plectranthus scutellarioides, *Br. Prodr.* 506; *Roxb. Fl. Ind.* iii. 21. P. nudiflorus, *Willd. Sp. Pl.* iii. 168. Germania nudiflora, *Poir. Dict. Suppl.* ii. 763.

Cultivated in INDIA.—DISTRIB. Malay Islands, Australia.

Stem 2–3 ft. *Leaves* 1–3 in., usually purplish beneath, base rounded or cuneate. *Flowers* ½ in., white with a blue lower lip, tube abruptly decurved. *Stamens* included. —There are several very distinct varieties described from Australia (Benth. Fl. Austral. v. 30).

6. **C. atropurpureus,** *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 54, and in *DC. Prodr.* xii. 74; tall, slender, finely pubescent, leaves long-petioled broadly ovate or rounded obtuse or acute coarsely crenate, flowers in lax whorled cymes which form narrow panicles, upper calyx-lip ovate subacute, teeth of lower variable, two lowest aristate. *Nunes Fl. Filip.* t. 208; *Wall. Cat.* 2733.

MALACCA, PENANG and SINGAPORE; *Wallich*, &c.—DISTRIB. Malay and Pacific Islands.

Stem 2–3 ft. *Leaves* 2–4 in., membranous, base rounded truncate or cuneate; petiole 1–2 in. *Cymes* irregularly branched, peduncled; flowers pedicelled. *Corolla* ⅓ in., much as in *C. scutellarioides*. *Stamens* included. *Fruiting calyx* variable, ⅙–¼ in. long.

7. **C. malabaricus,** *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 57, and in *DC. Prodr.* xii. 76; glabrous, puberulous or villous, leaves large membranous long-petioled ovate or lanceolate acute or acuminate crenate, flowers laxly cymose or racemose on the branches of spreading panicles, fruiting calyx broad membranous, upper lip large rounded acute, teeth of lower longer acuminate. *Wall. Cat.* 2735; *Thwaites Enum.* 238. C. ovatus & Macraei, *Benth. Lab.* 57, 58, and in *DC. l. c.* 76, 77. C. Macraei, *Bot. Mag.* t. 4690. C. Walkeri, *Benth. in DC. l. c.* 77.

TRAVANCORE and the NILGHIRI MTS.; *Wight*, *Gardner*. CEYLON; common up to 6000 ft.

Stem 2–3 ft., usually dark purple, as are the leaves beneath and peduncles, pedicels, and calyx. *Leaves* 3–6 in., petiole often as long, base rounded, cuneate or narrowly cordate; floral caducous. *Panicles* usually pyramidal; branches with distant whorls of cymes; flowers ¾–1 in. long. *Calyx* ¼ in. long and broad. *Corolla-tube* pale lilac, abruptly decurved, throat inflated; upper lip short, crenate, dark blue; lower boat-shaped, acute, pale. *Stamens* included.—Very variable.

VAR. *mollis*; leaves softly pubescent. C. mollis, *Benth. in D.C. l. c.* 77.—Ceylon.

VAR. *leptostachys*; puberulous, leaves narrowly oblong or lanceolate, flowers smaller.—Ceylon.

8. **C. inflatus,** *Benth. Lab.* 58, and in *DC. Prodr.* xii. 78; stout, glabrous or puberulous, leaves long-petioled ovate or lanceolate acuminate toothed or serrate, base cuneate, cymes lax-fld. racemed on the branches of a pyramidal panicle, corolla-tube very long flexuous, lips very small, calyx membranous, upper lip ovate acuminate, lateral teeth of lower small, lowest longer acuminate. *Bot. Mag.* t. 5236. *Wawra, Itin. Pr. S. Cob. Bot.* 105. C. Benthamianus, *Arn. Pugill.* 36, and in *Nov. Act. Nat. Cur.* xviii. 354.

CEYLON; Central Province, alt. 6–8000 ft., *Macrae*, &c.

Stem stout, green. *Leaves* 2–5 in., petiole 1–2 in. *Racemes* or branches of the panicle 3–6 in.; pedicels short. *Corolla* 1 in. long, pale lilac, slightly decurved at the middle, tube slender, as long as the cylindric throat, lips very short, upper crenate larger than the small ovate acute lower.

10. ANISOCHILUS, *Wall.*

Herbs or undershrubs. *Flowers* small, in dense oblong 4-gonal or cylindric spikes. *Calyx* suberect, inflated below the middle, 2-lipped or 5-toothed, rarely 1-lipped, upper lip entire and deflexed or short and 3-crenate. *Corolla* 2-lipped; tube slender, decurved; throat inflated; upper lip short, entire or 3–4-fid; lower elongate, concave. *Stamens* 4, filaments free. *Style* 2-fid. *Disc* lobed.—DISTRIB. Species about 16, Asiatic.

* *Fruiting calyx with the upper lip large, broad, entire, deflexed, concealing the mouth, lower truncate obscurely toothed.*

1. **A. carnosus,** *Wall. Pl. As. Rar.* ii. 18, *Cat.* 2753; annual, erect, glabrous or tomentose, leaves petioled ovate oblong or rounded obtuse crenate fleshy, floral ovate obtuse, fruiting spikes 4-gonous then cylindric obtuse, calyx glabrous pubescent or ciliate, lip deflexed ovate acute ciliate. *Benth. Lab.* 59, and in *DC. Prodr.* xii. 81; *Wight Ill.* t. 176 b, f. 1; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl.* 206. A. crassus, *Benth. in DC. l. c.* A. glaber, *Schrad. Ind. Sem. Hort. Goett.* 1833, 1. A. rupestris, *Wight Cat.* 2521. Plectranthus strobiliferus, *Roxb. Hort. Beng.* 45, and in *Fl. Ind.* iii. 23. P. carnosus, *Smith in Rees Cyclop.* v. 27. P. dubius, *Spr. Syst.* ii. 691. Lavandula carnosa, *Linn. Amœn. Acad.* x. 56, t. 3. Origanum watariense, *Ic. Roxb.*—*Rheede Hort. Mal.* x. t. 90.

WESTERN HIMALAYA; Kumaon and Garwhal, ascending to 8000 ft., *Edgeworth*, and throughout CENTRAL and SOUTHERN INDIA to Travancore and CEYLON.—DISTRIB. Ava.

Stem 1–2 ft., stout, 4-angled. *Leaves* 2–3 in., rugose, sometimes densely tomentose; petiole ½–2 in. *Spikes* long-peduncled, 1–3 in. long, ⅓–¾ in. diam.; flowers ⅓ in. long, pale purple. *Calyx-tube* very variable in length, glabrous or pubescent; upper lip sometimes with the tip erect throughout the spike.—A protean plant, the varieties of which I fail to distinguish by good characters.

VAR. *purpurascens*, Benth., from Ava, has narrow purple cylindric spikes and very short calyces.

VARR. *glabrior* and *villosior*, Benth., explain themselves.

VAR. ε. ? *viridis*, Benth. (*A. rupestris*, Wight), is founded on an immature plant with the habit of *A. eriocephalus*. *A. crassus*, Benth., differs in no way from the type.

2. **A. scaber,** *Benth. in DC. Prodr.* xii. 81; shrubby, hoary-tomentose, leaves small petioled oblong obtuse crenulate thick, peduncles very long stout, spikes 1–3 oblong, calyx pubescent, lip deflexed ovate obtuse ciliate.

DECCAN PENINSULA; Courtallum, *Wight*.

Branches short, stout, ascending from a woody stem. *Leaves* 1–1½ in., densely tomentose beneath. *Peduncles* 6–12 in.; spikes 1–1½ by ½ in., purplish when dry. *Calyx-tube* very short; upper lip glabrous except the ciliate margins.

3. **A. eriocephalus,** *Benth. in DC. Prodr.* xii. 81; herbaceous, glabrous or puberulous, leaves petioled broadly ovate or cordate crenate, peduncles slender, spikes many ovoid or cylindric, calyx villous or woolly,

upper lip deflexed broadly ovate acuminate. A. decussatus, *Dalz. & Gibs. Bomb. Fl.* 206.

BEHAR; on the Kymore Hills, *J. D. H.* DECCAN PENINSULA; rocky ghats from the Concan, *Dalzell*, &c., southwards; Bellary, *Wight.*

A more slender plant than the Concan form of *A. carnosus*, but perhaps only a state of that variable plant.

4. **A. Wightii,** *Hook. f.*; shrubby, hoary-tomentose, leaves shortly petioled oblong or ovate obtuse crenate, peduncles long stout, spikes 3–6 cylindric narrow, calyx minute villous, upper lip deflexed very small acute.

DECCAN PENINSULA; Anamallay Mts., *Wight.*

A very distinct-looking plant, with the habit and dense pubescence of *A. scaber*, but the long narrow spikes not $\frac{1}{4}$ in. diam., almost black when dry, and the minute calyx (about $\frac{1}{10}$ in. long) with acute upper lip, seem very different.

5. **A. paniculatus,** *Benth. in DC. Prodr.* xii. 82; stout, shrubby?, glabrous or hoary-tomentose, leaves shortly petioled obovate or rounded obtuse crenate, spikes numerous small short panicled, calyx pubescent or tomentose very short, upper lip small deflexed obtuse ciliate.

DECCAN PENINSULA; Maisor? *G. Thomson.* CEYLON; *Herb. Rottler, Walker.*

Stem very stout below. *Leaves* and *branches* densely ciliate-tomentose in the Madras specimens, puberulous brown in the Ceylon ones. *Spikes* $\frac{1}{4}$–$\frac{2}{3}$ in. long, on divaricating peduncles and pedicels. *Calyx* hispidly pubescent, about $\frac{1}{12}$ in. long, tube very short. *Fruit* not seen.

** *Fruiting calyx with the upper lip short, broad, recurved or hooded. entire or 3-notched, not concealing the mouth, lower truncate.*

6. **A. dysophylloides,** *Benth. in Wall. Pl. As. Rar.* ii. 19, *Lab.* 60, and in *DC. Prodr.* xii. 82; silkily tomentose, stout, shrubby, decumbent, leaves thick subsessile obovate or oblong obtuse entire or crenate, spikes very many longer than the leaves axillary and terminal cylindric, peduncles very stout, calyx woolly, corolla-tube very short included. *Wall. Cat.* 2756; *Wight Ic.* t. 1434. A. purpureus, and A. albidus, *Wight Ic.* tt. 1435, 1436.

NILGHIRI HILLS; *Wight*, &c.; ANAMALLAYS, *Beddome.*

Stem as thick as a swan's quill, woody. *Leaves* 1–2 in., narrowed into the petiole, silky on both surfaces. *Spikes* 1–3 in.; peduncles short, very stout. *Fruiting calyx* $\frac{1}{10}$ in. long, nearly as broad. *Corolla* white or purple.

7. **A. plantagineus,** *Hook. f.*; dwarf, shrubby, pubescent, stem or branches very short, leaves sessile oblong-obovate obtuse entire, spikes terminal solitary elongate narrow, peduncles very stout tomentose, calyx woolly, corolla-tube exserted declinate.

DECCAN PENINSULA; Bababoodan Hills, *Dalzell, Law, Stocks.*

Rootstock often as thick as the thumb, sending up short stout branches leafy at the top. *Leaves* $\frac{3}{4}$–$1\frac{1}{2}$ in. *Spikes* 2–3 in., longer than their peduncles; bracts 3-lobed. *Calyx* small, upper lip obscurely lobed.

8. **A. suffruticosus,** *Wight Ic.* t. 1437; shrubby, very stout, densely thickly tomentose, leaves shortly petioled ovate-lanceolate subacute entire, nerves very stout and close beneath, spikes numerous long peduncled in terminal racemes, calyx pubescent, corolla-tube exserted sharply declinate from above the base, calyx-lips very short truncate.

NILGHIRI MTS.; Sisparah, *Wight*, *Gardner*; Tinnevelly, *Beddome* (a drawing).
Branches (annual from a woody rootstock, *Wight*) as thick as a swan's quill, covered with broad scars, spreading, tomentose above. *Leaves* towards the ends of the branches, 1½–2 in. long; petiole and midrib very stout. *Spikes* 1½–2 in., stout, peduncles usually longer, rarely with 2 spikes, rusty brown when dry.—The Ceylon plant referred to this by Thwaites seems quite different (see end of genus).

9. **A. sericeus,** *Benth. in DC. Prodr.* xii. 82; erect, densely silkily tomentose, leaves densely crowded sessile linear-oblong obtuse subcrenate or entire, nerves stout parallel, spikes in terminal panicles, bracts much longer than the flowers.

DECCAN PENINSULA; Courtallum, *Wight*.
Stem stout, simple, 1–2 ft., densely leafy. *Leaves* 1½–2¼ in., rather thick, imbricating, narrowed at the very base. *Spikes* 1–2 in., shortly peduncled; bracts ovate acute, ⅙ in. long, imbricating over the young flowers.—The material from which Bentham described this consists of two very imperfect specimens of the true plant, along with one of *A. dysophylloides*. Wight's later specimens are in full leaf, but very young flower.

10. **A. robustus,** *Hook. f.*; suffruticose, very robust, densely tomentose, leaves very large stoutly petioled ovate crenulate thick reticulate above, spikes slender in terminal panicles with a stout woolly rachis and short peduncles, fruiting calyx ventricose, upper lip truncate recurved, lower very short.

DECCAN PENINSULA; Courtallum, *Wight*.
Stem as thick as the little finger, densely woolly. *Leaves* 4–6 by 2–3½ in., obtuse, most densely woolly beneath, nerves diverging, base rounded; petiole 1–2 in., woolly. *Panicle* of spikes 10 in.; rachis woolly. *Spikes* 2–3 in., slender, fruiting only seen. *Fruiting calyx* ⅛ in., hoary; upper calyx-lip contracted at the truncate tip. *Nutlets* oblong.—A very singular species.

11. **A. verticillatus,** *Hook. f.*; silkily villous, stem stout erect simple, leaves mostly whorled sessile narrowly lanceolate obtuse or acute crenulate or entire, spike large solitary terminal, bracts large lanceolate, fruiting calyx shortly cylindric, lips very short truncate.

The CONCAN; Cheetah Hills, at Purwar Ghat, *Ritchie, Dalzell*, &c.; Golconda, *Beddome*.
Stem 1½–3½ ft., channelled when dry. *Leaves* 4–6 in a whorl, 2–3 in., spreading and recurved, upper smaller rarely alternate. *Spike* 2–7 in., peduncled; bracts very variable, sometimes ⅓ in. *Corolla* ⅓ in. long, pubescent, very pale blue. *Fruiting calyx* ⅙ in. long, pubescent, mouth transverse, small.

*** *Fruiting calyx with the upper lip forming a narrow 3-toothed galeate beak decurved closing the mouth; lower very short.*

12. **A. pallidus,** *Wall. Pl. As. Rar.* ii. 18, and *Cat.* 2754; stem tall, branched, puberulous, leaves long-petioled ovate-lanceolate acuminate membranous toothed, spikes panicled long-peduncled, flowering narrowed upwards, fruiting-calyx tomentose, midlobe of upper lip subulate. *Benth. Lab.* 60, and in *DC. Prodr.* xii. 82.

SIKKIM HIMALAYA, alt. 1–5000 ft.; *J. D. H., Clarke*. BURMA; Taong-dong, *Wallich*; Patkoye Mts., *Griffith*; Prome Hills, *Benson*.
Annual, 2–3 ft. *Leaves* 3–8 in.; petiole 1–2 in., very slender. *Spikes* 1½–3 in., subtomentose, shorter than their peduncles; fruiting cylindric, much thickened. *Corolla* blueish, tube slender; upper lip inflated, minutely toothed; lower longer, linear, obtuse. *Fruiting calyx* ⅙ in. long, like a cat's claw.

**** *Fruiting calyx slit in front, mouth very oblique, 1-lipped, lip decurved, 5-toothed, not closing the mouth.*

13. **A. polystachyus,** *Benth. in Wall. Pl. As. Rar.* ii. 19, *Lab.* 66, and in *DC. Prodr.* xii. 82; finely tomentose, stem tall branched, leaves subsessile lanceolate acuminate membranous serrate, spikes panicled long peduncled, flowering narrowed upwards, fruiting calyx curved upwards tomentose. *Wall. Cat.* 2755.

TROPICAL HIMALAYA, from Nepal, *Wallich*, to Mishmi, *Griffith*. KHASIA MTS.; *J. D. H. & T. T.* ASSAM; *Jenkins*.

Annual. *Stem* strict, 3–9 ft., subsimple below. *Leaves* 3–6 in., much narrowed at the base, almost petioled. *Panicles* of spikes sometimes much branched branches and peduncles stout, stiff, suberect. *Spikes* 1–1½ in., hoary-tomentose, fruiting thickened, cylindric. *Corolla* cream-coloured, form as in *A. pallidus*, but tube longer. *Fruiting calyx* ⅛ in. long, mouth vertical, teeth subequal. *Nutlets* ellipsoid.

DOUBTFUL SPECIES.

A. SUFFRUTICOSUS, *Thwaites Enum.* 238, is not Wight's plant of that name, but more like *A. paniculatus*. The specimen is too imperfect for determination.

A. ADENANTHUS, *Dalz. & Gibs. Bomb. Fl.* 206; spikes dense, pyramidal, floral leaves lanceolate acuminate pubescent 3-nerved 3 lines long, calyx minute oblique truncate scarcely toothed tomentose, corolla glandular-dotted 5 lines long tomentose, lower lip long entire boat-shaped, upper 3- or 4-lobed rounded obtuse short.—Bababoodan Hills, near Darwar, *Dalzell*.

10*. HYPTIS, *Jacq.*

Herbs or shrubs. *Inflorescence* various, capitate in the following species. *Corolla* 5-lobed, lower lobe or lip abruptly deflexed, saccate, contracted at the base. *Stamens* 4, declinate; anther-cells confluent. *Style* subentire or 2-fid. *Nutlets* various.—Species 250, all American.

1. **H. brevipes,** *Poit.*; *Benth. in DC. Prodr.* xii. 107; erect, stem pilose or glabrate, leaves petioled ovate oblong or lanceolate serrate hispid above or glabrate, peduncles equalling the globose heads or shorter, bracts lanceolate, calyx pubescent, teeth erect subulate.

MALACCA, *Griffith*; introduced. SINGAPORE; *Anderson*.—DISTRIB. Mexico to Brazil, introduced into Tropical Africa and the Malay Archipelago.

An erect annual. *Leaves* 2–3 in. long, nerves beneath hispid or glabrous. *Heads* ¼ in. diam.; bracts often as long, inner and calyx ciliate. *Corolla* about equalling the calyx.

2. **H. suaveolens,** *Poit.*; *Benth. in DC. Prodr.* xii. 126; stem hairy, leaves petioled broadly ovate sinuate and serrulate pubescent villous or tomentose lower cordate, peduncles racemose equalling the globose heads, bracts minute setaceous, calyx striate, mouth villous, teeth erect subulate. Bysteropogon graveolens, *Blume Bijd.* 824. Schauera graveolens, *Hassk. in Flora*, 1842, ii. *Beibl.* 25.

DECCAN PENINSULA, CACHAR and NICOBAR ISLANDS; introduced.—DISTRIB. Trop. America, introduced into Trop. Asia.

A rigid annual, 2–3 ft. *Leaves* 1–3 in., very variable. *Heads* secund, fruiting ½ in. long, sometimes reduced to a few flowers.

11. LAVANDULA, *Linn.*

Herb or shrub. *Leaves* entire or cut. *Flowers* in 2–10 fld. whorls

collected into simple or branched spikes. *Calyx* erect, 13–15-nerved, 5-toothed. *Corolla* blue, 2-lipped, upper lip 2-fid, lower 3-partite, lobes all spreading. *Stamens* 4, declinate, included, filaments free; anther-cells confluent. *Style* 2-fid. *Nutlets* smooth.—Species about 20, chiefly Mediterranean.

1. **L. Gibsoni,** *Grah. Cat. Bomb. Pl.* 149; villous, leaves pinnatifid, lobes oblong or linear, spikes densely villous, bracts ovate-lanceolate. *Dalz. & Gibs. Bomb. Fl.* 206. L. Perrottetii, *Benth. in DC. Prodr.* xii. 147. L. Lawii, *Wight Ic.* t. 1439.

The CONCAN; hills at Sattara, *Law*, &c.

Stem 2–3 ft., robust, leafy. *Leaves* 4–8 in., lower petioled, lobes acute or obtuse. *Spikes* few, 1–2 in., robust; bracts villous, 1-fld., ¼ in. *Fruiting calyx* 1 in. long.

2. **L. Burmanni,** *Benth. Lab.* 157, and in *DC. Prodr.* xii. 147; pubescent, leaves pinnatisect, segments linear simple or cut, spikes pubescent, bracts subulate. *Grah. Cat. Bomb. Pl.* 149; *Wight Ic.* t. 1438; *Dalz. & Gibs. Bomb. Fl.* 1438. Wawra, *Itin. Pr. S. Cob. Bot.* 109. L. multifida, *Burm. Fl. Ind.* 126 (*excl.* t. 38, f. 1). Bysteropogon bipinnatus, *Roth Nov. Sp.* 255. Chætostachys multifida, *Benth. in Wall. Pl. As. Rar.* ii. 19, and *Cat.* 2757.

DECCAN PENINSULA; common on the West from the Concan to Coorg. CENTRAL INDIA; Jubbulpore, *Beddome.*

Stem 2–3 ft., stout or slender, simple or branched. *Leaves* 3–4 in. long and broad; segments $\frac{1}{10}$–$\frac{1}{6}$ in. broad. *Spikes* solitary or few, or numerous and subumbellate; bracts 1-fld., nearly glabrous, tips capillary. *Corolla* blue or white. *Fruiting calyx* $\frac{1}{6}$ in. long.

12. POGOSTEMON, *Desf.*

Herbs or undershrubs. *Leaves* opposite, very rarely 3-nately whorled. *Flowers* small, in solitary or panicled spikes or contracted racemes formed of many and dense-fld. subcapitate cymes (whorls). *Calyx* subequally 4–5-toothed. *Corolla-tube* exserted or included; limb spreading, sub-2-lipped; lobes 4, lower usually longest. *Stamens* 4, exserted, straight or declinate, filaments usually bearded; anther-cells confluent. *Disc* subentire, equal. *Style* 2-fid. *Nutlets* smooth, ovoid or oblong.—Species about 30, Indian and E. Asiatic.

* Spikes or racemes terminal and axillary, forming a panicled inflorescence. Filaments bearded in all.

† *Whorls forming continuous (rarely interrupted) spikes.*

1. **P. paniculatus,** *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 153, and in *DC. Prodr.* xii. 151; erect, branched, laxly hairy or villous, leaves petioled ovate irregularly inciso-serrate, base cuneate, whorls globose secund in slender spikes, bracts obliquely suborbicular membranous ciliate, calyx narrow, teeth lanceolate ciliate, filaments bearded. *Wall. Cat.* 1561; *Grah. Cat. Bomb. Pl.* 149; *Dalz. & Gibs. Bomb. Fl.* 207. Elsholtzia paniculata, *Willd. Sp. Pl.* iii. 59. Hyssopus cristatus, *Lamk. Dict.* iii. 187.—*Rheede Hort. Mal.* x. t. 65.

TENASSERIM; MARTABAN and Tavoy, *Wallich*, &c. PEGU; *M'Clelland.* W. DECCAN PENINSULA, from the S. Concan to Travancore.

Stem 3–5 ft., rather flexuous. *Leaves* 3–5 in., very membranous; petiole short or long. *Spikes* 4–8 in.; whorls ⅓ in. diam.; bracts very variable, shorter or longer than the calyces, regularly secund and imbricate. *Calyx* ⅙–¼ in. long, membranous; teeth variable in length.—P. comosus, *Miq.*, of Java, is very near this.

2. **P. Gardneri,** *Hook. f.*; erect, stout, villous, leaves long-petioled ovate inciso-crenate, base cuneate, whorls globose in stout dense spikes, bracts oblong-lanceolate membranous ciliate, calyx-teeth short broad ciliate.

NILGHIRI MTS.; Wynaad, *Wight, Gardner.*

Very near *P. paniculatus*, but much stouter, more villous, leaves longer petioled, whorls denser, bracts much narrower, not so unilateral and regularly secund and imbricate, and calyx shorter with broader teeth.

3. **P. plectranthoides,** *Desf. in Ann. Mus.* ii. 156, t. 6; shrubby, hoary-pubescent, leaves petioled ovate acute doubly-toothed or -serrate, whorls subsecund crowded in large stout spikes, bracts ovate glandular exceeding the hirsute calyx, calyx-teeth shortly triangular-lanceolate ciliate. *Wall. Cat.* 1530; *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 153, and in *DC. Prodr.* xii. 151; *Dalz. & Gibs. Bomb. Fl.* 207; *Bot. Mag.* t. 3238. ? Origanum benghalense, *Burm. Fl. Ind.* 128, t. 38, f. 3. ? O. indicum, *Roth Nov. Sp.* 265. Mentha secunda, *Roxb. Hort. Beng.* 44. ? M. fruticosa, *Roxb. Fl. Ind.* iii. 6 (not of his drawings).

WESTERN HIMALAYA, from Nepal to Simla, alt. 1–5000 ft. LOWER BENGAL and BEHAR; Patna and top of Parusnath, *J. D. H.*, &c. The CONCAN, CANARA and the CIRCARS.

A large bush; branches round, often dark purple. *Leaves* 3–6 in., longer than the petiole. *Panicle* usually elongate, whorls distant or confluent, silkily villous. *Calyx* subcylindric, ⅙ in., silky, ciliate. *Corolla* pink or white.—Roxburgh's description of *Mentha fruticosa* agrees with this, but his drawing represents a different plant with glabrous filaments.

4. **P. villosus,** *Benth. Lab.* 153, and in *DC. Prodr.* xii. 152; stout, erect, villous all over, leaves large long-petioled ovate acute crenulate or sub-sinuate and crenate, whorls crowded in cylindric panicled stout spikes not secund, bracts ovate equalling the villous calyx, calyx silky or villous, teeth shortly lanceolate. ? Elscholzia villosa, *Roxb. Fl. Ind.* iii. 4.

SILHET; *Wallich.*

There are two forms of this in Herb. Wallich, both with leaves 5–7 in. long and 2–4 broad; one is more robust with exactly ovate finely crenulate leaves; the other is more villous, and has broader sinuate and obscurely crenate leaves, and much more numerous denser and shorter branched panicles. In both the whorls form continuous cylindric spikes 2–3 in. long and ½ in. diam. *Calyx* ⅙ in., sessile, narrow.

5. **P. purpurascens,** *Dalz. in Hook. Kew Journ.* ii. 337; erect, branched, softly villous with spreading hairs, leaves long-petioled large membranous ovate or ovate-lanceolate sinuate or cut and toothed or crenate, base narrowly cuneate, whorls dense-fld. globose secund continuous or separate in long peduncled hirsute spikes, bracts narrow falcate equalling the calyx ciliate, calyx tubular, teeth long-subulate ciliate. *Dalz. & Gibs. Bomb. Fl.* 207.

The CONCAN and CANARA; *Law*, &c.

Habit and villosity of *P. Gardneri*, but the calyx-teeth are much longer and more slender. *Stem* 4-angled. *Leaves* sometimes 9 in. long. *Spikes* sometimes as long. *Calyx* ⅓ in. long. *Corolla* white, with purple upper lip.—Probably a large form of *P. parviflorus.*

6. **P. parviflorus.** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and

in *DC. Prodr.* xii. 152; stout, erect, branched, glabrous pubescent or scaberulous, leaves long-petioled ovate or ovate-lanceolate singly or doubly crenate-toothed or serrate, base cuneate, whorls dense-fld. subglobose in dense cylindric or one-sided softly hairy spikes, bracts elliptic-ovate exceeding the hirsute calyx, calyx-teeth short triangular-lanceolate ciliate. *Wall. Cat.* 1531. P. pubescens, *Benth. in DC. l. c.* P. frutescens, *Grah. Cat. Bomb. Pl.* 149. P. purpuricaulis, *Dalz. in Hook. Kew Journ.* ii. 336; *Dalz. & Gibs. Bomb. Fl.* 207. P. intermedius, *Wall. Cat.* 2327.

SUBTROPICAL HIMALAYA, from Kumaon to Bhotan, alt. 500–4000 ft. ASSAM, KHASIA MTS. and SILHET, alt. 2–3000 ft. CHITTAGONG and TENASSERIM. WEST DECCAN PENINSULA, from the Concan to the Anamallays.—DISTRIB. Burma, Hongkong.

This most resembles a small *P. plectranthoides*, the bracts imbricating over the flowers in the young spikes, but spikes and narrower bracts are much smaller, and the whole plant when pubescent is never hoary. In its usual glabrous form it is a very distinct plant. The leaves vary much in shape and cutting of the margin, and attain 9 inches in length, and are sometimes velvety beneath. The stem and branches are usually dark purple, but not constantly. *Calyx* $\frac{1}{6}$ in. long, narrow, usually purplish. —It is difficult to distinguish some states of this from *P. Heyneanus*. Bentham says that his var. *Jacquemontii* is almost intermediate between *P. parviflorus* and *glaber*; it has more glabrous leaves and villous spikes.

7. **P. glaber,** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. Prodr.* xii. 152; erect, branched, glabrous or sparsely hairy, leaves long-petioled ovate or ovate-lanceolate acuminate doubly-toothed or -serrate, whorls small subglobose dense-fld. continuous in slender ciliate spikes, bracts ovate much shorter than the very small calyx, calyx-teeth triangular shortly ciliate. *Wall. Cat.* 1533.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 1–3000 ft., *J. D. H.* KHASIA MTS., alt. 4000 ft.; *Griffith, J. D. H. & T. T.*

Habit of *P. parviflorus*, but spikes more slender, bracts smaller, and calyx only $\frac{1}{10}$ in. long, obovoid, with shortly ciliate teeth. *Stem* and *branches* green or purple, sometimes very dark.

†† *Whorls usually separate, forming interrupted spikes (except* P. Patchouli, *var.* suavis).

8. **P. tuberculosus,** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. Prodr.* xii. 152; stout, erect, branched, scabrid with stellate hairs, leaves long-petioled ovate or deltoid-ovate acuminate doubly toothed, base cuneate, whorls small subglobose many-fld. distant or separate on the long slender panicled spikes, bracts scabrid oblong shorter than the small scabrid obovoid calyx, calyx-teeth short triangular ciliate.

TROPICAL HIMALAYA, alt. 1–5000 ft.; from Nepal, *Wallich*, to Bhotan, *Clarke*.

Stem and *branches* woody, terete, striate. *Leaves* 3–5 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., scabrid on both surfaces. *Spikes* 7–10 in. *Calyx* $\frac{1}{10}$ in. *Corolla* twice as long, purple.

9. **P. Patchouli,** *Pelletier in Mem. Soc. Sc. Orleans*, v. 5, *with fig.*; erect, branched, pubescent or glabrate, leaves long-petioled ovate acute acuminate or obtuse crenate or simply or doubly toothed or incised, base cuneate, whorls subglobose many- and dense-fld. distinct or subconfluent on the slender pubescent or tomentose panicled spikes, calyx pubescent or tomentose, teeth triangular ciliate. *Benth. in DC. Prodr.* xii. 153; *Dalz. & Gibs. Bomb. Fl., Addend.* 66. P. Heyneanus, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. l. c.*; *Wall. Cat.* 1532; *Grah. Cat. Bomb. Pl.*

149; *Dalz. & Gibs. Bomb. Fl.* 207; *Thwaites Enum.* 239; *Wight Ic.* t. 1440. ? Origanum indicum, *Roth Nov. Sp.* 265.—*Rheede Hort. Mal.* x. 77.

WESTERN PENINSULA, from Bombay southwards, wild and cultivated. CEYLON, common. (MALACCA and SINGAPORE, cult.)—DISTRIB. Sumatra and Borneo (cult. ?).

A herb, 2–3 ft.; stem more or less softly hairy. *Leaves* 2–3 in., rarely more, subglabrous, membranous, sometimes incised; petiole $\frac{1}{2}$–1$\frac{1}{2}$ in. *Spikes* 3–6 in., rarely short and dense; whorls $\frac{1}{2}$ in. diam., usually distant; bracts elliptic, acute, equalling the calyx or shorter. *Calyx* $\frac{1}{6}$ in., teeth acute. *Corolla* very small, tube shortly exserted.—Perhaps only a var. of *P. parviflorus*. A tracing of Pelletier's figure kindly sent me by M. de Candolle enables me to identify *P. Heyneanus* with *P. Patchouli*. It is a common Indian garden plant, noted for its perfume, often much altered by cultivation.

7090 VAR. *suavis*; leaves larger more rounded 3 in. long and broad, margin lobulate and crenate, spike much broader, whorls $\frac{3}{4}$ in. diam., calyx $\frac{1}{4}$ in. angular more pubescent, teeth subulate-lanceolate. P. suavis, *Tenore in Giorn. Bot. Ital.* (1847), ii. 56. P. Patchouli, *Hook. Kew Journ. Bot.* i. 328, t. 11, *excl. syn. Putcha-pat.*; *Wallich in Kew Journ.* i. 22.—Cult. in Palermo and Kew Bot. Gardens.—This more resembles *parviflorus* in the shape of the calyx-teeth, but it has the scent of Patchouli.

10. **P. amarantoides,** *Benth. in DC. Prodr.* xii. 153; glabrous or minutely pubescent, leaves ovate or oblong acuminate incised-serrate, whorls small few- or many-fld. separate or confluent on the long slender panicled spikes, bracts short, calyx small terete glabrous or hoary, teeth short triangular pubescent within, edges not ciliate but with finely pubescent margins.

SIKKIM HIMALAYA, alt. 5-6000 ft. KHASIA MTS., alt. 5–6000 ft.; *Griffith*, &c.

A tall leafy herb. *Leaves* 3–6 in., serrate or biserrate, membranous; petiole 1–2 in., slender. *Spikes* 2–6 in.; whorls $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; bracts elliptic. *Calyx* $\frac{1}{12}$–$\frac{1}{10}$ in., campanulate, terete, more pubescent in the Khasia form. *Corolla* minute, white or pink. *Filaments* purple.—Flowers much smaller, and whole plant more glabrous than in its allies.

11. **P. elsholtzioides,** *Benth. in DC. Prodr.* xii. 153; erect, branched, stem above young parts and inflorescence hoary-tomentose, leaves petioled lanceolate long-acuminate serrulate glabrous, whorls small subsecund many-fld. separate or confluent in very slender spikes, calyx small terete hoary, teeth narrow subacute not ciliate.

BHOTAN, *Griffith*. KHASIA MTS., *Griffith*; Churra, alt. 4000 ft., *J. D. H. & T. T.*

Very leafy; stem and branches slender. *Leaves* 4–6 in., petiole rather short. *Spikes* 3–4 in.; whorls sometimes all secund, $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Calyx* $\frac{1}{10}$ in. long. *Corolla* very short, purple. *Filaments* sparingly hairy.—The very narrow leaves and small secund hoary spikes well distinguish this.

** Spikes or racemes simple, axillary and terminal or solitary.

† *Filaments bearded.*

12. **P. rupestris,** *Benth. Lab.* 156, and in *DC. Prodr.* xii. 154; glabrous, leaves small ovate or ovate-lanceolate coarsely obtusely serrate, racemes slender, whorls distant few-fld., bracts and bracteoles minute, calyx glabrous, teeth short ovate.

CEYLON; Central Province, alt. 5–8000 ft., *Macrae*, &c.

Stem 1–2 ft., often decumbent below. *Leaves* 1–1$\frac{1}{2}$ in., obtuse, base cuneate

rounded or subcordate, brown when dry; petiole slender, $\frac{1}{2}$–$\frac{3}{4}$ in. *Racemes* 1–3 in.; whorls 3–5-fld. *Calyx* $\frac{1}{6}$ in. long. *Corolla* minute.

13. **P. hirsutus,** *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; stem hirsute with reflexed hairs or glabrate, leaves small ovate or ovate-lanceolate coarsely serrate, spikes short stout usually dense-fld., bracts linear-subulate, calyx hispid, teeth lanceolate subulate ciliate. P. rupestris, var. β. hirsutus, *Thwaites Enum.* 239.

CEYLON; Central Province, alt. 5–7000 ft., *Macrae*, &c.

Stem 1–2 ft., branched, decumbent and rooting below. *Leaves* 1–2 in., hairy above and on the nerves beneath, base rounded or acute; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Spikes* usually sessile and dense-fld., $\frac{1}{2}$ in. diam., hirsute. *Calyx* $\frac{1}{5}$ in. long, inflated. *Corolla* minute.—Thwaites regards this as a var. of *P. rupestris*, but this must be through inadvertence.

14. **P. paludosus,** *Benth. in DC. Prodr.* xii. 154; stem sparingly pubescent or glabrate, leaves rounded-ovate obtuse coarsely crenate, base rounded, spike strict stiff, whorls small remote few-fld., bracts and bracteoles minute, calyx terete hispid, teeth triangular subacute ciliate.

NILGHIRI HILLS; Ootamacund, *Perrottet, Wight.*

Stem stiff, erect. *Leaves* 2 in. long, and nearly as broad, sparingly hairy above and on the nerves beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., slender. *Spike* 3–5 in., rachis and calyces hispid with spreading hairs; whorls $\frac{1}{3}$ in. diam. *Calyx* $\frac{1}{8}$ in. long.—I have seen only indifferent specimens gathered by Wight.

15. **P. fraternus,** *Miquel Fl. Ind. Bat.* ii. 963; much branched, branches above and racemes glandular-tomentose or hirsute, leaves ovate singly or doubly crenate or serrate, racemes terminating all the branches elongate, whorls distinct many-fld., bracts and bracteoles linear, calyx pedicelled hirsute, teeth long lanceolate ciliate. Pogostemon n. 28, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 3–5000 ft.; *J. D. H., Clarke.* KHASIA MTS.; *Lobb.* TENASSERIM; *Beddome.*—DISTRIB. Java.

Stem 2–3 ft.; branches straggling. *Leaves* 2–4$\frac{1}{2}$ in., base acute rounded or cordate; petiole sometimes as long as the blade. *Racemes* 3–6 in. long, nearly $\frac{1}{2}$ in. diam.; whorls close but distinct; bracts and bracteoles often as long as the flowers, but very variable; pedicel sometimes as long as the calyx, which is $\frac{1}{3}$ in. long or less and angled. *Corolla* funnel-shaped, twice as long as the calyx.—Miquel describes the filaments as glabrous in the Javan plant; they are hairy towards the base in the Indian.

16. **P. Wightii,** *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; hirsute with long lax cellular often glandular hairs, much branched, leaves ovate doubly crenate or sublaciniate, base rounded or broadly cuneate, spikes stout cylindric dense-fld., whorls densely crowded, bracts and bracteoles short linear, calyx inflated membranous terete glabrous or sparsely hairy, teeth triangular ciliate. P. petiolaris, *Benth. in DC. l. c.* P. hirsutus, *Wight Ic.* t. 1442.

NILGHIRI and ANAMALLAY MTS., *Wight*, &c., in wet places.

Branches suberect or spreading, stout. *Leaves* 1–2 in., base rarely subcordate; petiole half as long as the blade. *Spikes* 2–4 in., very stout, $\frac{2}{3}$ in. diam.; lowest whorls sometimes remote. *Calyx* $\frac{1}{6}$ in. long, sessile. *Corolla-tube* very short.—Two specimens were amongst the Concan collections of Stocks, but I suspect were from the south.

17. **P. mollis,** *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; villous,

softly tomentose or finely pubescent, leaves shortly petioled orbicular or oblong crenate, tip rounded, spikes cylindric dense-fld., whorls crowded or the lowest distant, bracts and bracteoles slender, calyx small sessile terete villous, teeth subulate-lanceolate ciliate. P. rotundatus, *Wight Ic.* t. 1441.

NILGHIRI HILLS; common on outskirts of forests, alt. 7–8000 ft., *Wight*, &c. The CONCAN; *Dalzell, Stocks.*

A low-growing plant, very variable in hairiness, branched from the woody base; hairs of branches not reflexed. *Leaves* 1–1½ in. *Spikes* 3–7 in., ½ in. diam., flexuous, rachis stout. *Calyx* ⅙ in. *Corolla* white, tube hardly exserted. *Filaments* bearded at the middle.—I do not find the leaves to be acute, as represented by Wight, in any of the numerous specimens examined.

18. **P. rotundatus,** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 155, and in *DC. Prodr.* xii. 155; low, villous, leaves orbicular doubly crenate, base rounded truncate or cordate, spikes stout dense-fld., whorls distinct but close many-fld., bracts and bracteoles linear-subulate, calyx large angled villous, teeth triangular-lanceolate ciliate. *Wall. Cat.* 1535.

DECCAN PENINSULA; *Heyne.*

Stem short, ascending, hairs not reflexed. *Leaves* 1–2½ in. long and broad, laxly hairy on both surfaces; petiole 1 in. and less. *Spikes* 3–5 in., ¾ in. diam., rachis stout. *Calyx* sessile, ¼ in. long. *Corolla-tube* hardly exceeding the calyx. *Filaments* bearded.—Only known from specimens distributed by Wallich. In foliage it much resembles the *P. Patchouli* figured in the Kew Journal of Botany, but the calyx is much larger, with broader teeth and the corolla-tube shorter, and there is no appearance of a paniculate form of inflorescence.

19. **P. vestitus,** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 155, and in *DC. Prodr.* xii. 155; shrubby, densely white-woolly, leaves shortly petioled thick ovate oblong or cordate crenate rugose above, tip rounded, spikes short thick dense, whorls confluent, bracts and bracteoles linear-subulate, calyx large terete densely villous, teeth triangular-lanceolate. *Wall. Cat.* 1534.

DECCAN PENINSULA, *Heyne*; Paul Ghaut, *Wight.*

A low species; branches stout, terete, often bearing below tufts of long soft shaggy or silky hairs. *Leaves* 1–1½ in., nerves beneath very thick, surfaces equally woolly; petiole stout, ¼–½ in. *Spikes* 2–4 in., ¾–1 in. diam. *Calyx* ¼ in. long and upwards, teeth woolly not ciliate. *Corolla-tube* a little longer than the calyx. *Filaments* bearded in the middle.

20. **P. strigosus,** *Benth. in DC. Prodr.* xii. 155; erect, branches strigose with erect hairs, leaves subsessile lanceolate acuminate serrate hairy, spikes long slender, whorls confluent or separate below, bracts and bracteoles long slender, calyx tubular terete hirsute, teeth unequal subulate ciliate. Dysophylla strigosa, *Benth. in Wall. Plant. As. Rar.* i. 30, and *Cat.* 1549, *Lab.* 157.

KHASIA MTS., alt. 4–5000 ft.; *Wallich*, &c.

Stem 2–3 ft.; branches erect. *Leaves* sometimes ternately whorled, 2–3 in., narrowed into the very short stout petiole. *Spikes* 3–5 in., ⅓ in. diam., rachis stout. *Calyx* ⅙ in., sessile. *Corolla* very small, tube hardly exserted, lobes sparingly hairy. *Filaments* ⅙ in., bearded in the middle.

†† *Filaments naked or nearly so.*

21. **P. atropurpureus,** *Benth. in DC. Prodr.* xii. 154; shrubby, densely velvety, leaves thick stoutly petioled ovate subacute doubly crenulate, spikes with the rachis very stout, whorls crowded few-fld., bracts and

bracteoles minute setaceous, calyx terete tubular velvety, lobes short triangular obtuse ciliate. P. imberbe, *Wight mss.*

NILGHIRI HILLS ; *Perrottet, Wight, Gardner.*

Branches terete, woody ; hairs most dense, reflexed. *Leaves* 1–2 in., dark brown when dry, velvety on both surfaces, base subacute. *Calyx* $\frac{1}{8}$–$\frac{1}{4}$ in. long, teeth short, throat villous. *Corolla* dark purple ; tube slender, exserted. *Filaments* glabrous.

22. **P. speciosus,** *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 156, and in *DC. Prodr.* xii. 155 ; branches above petioles and spikes hirsute with long spreading and glandular hairs, leaves large long-petioled broadly ovate doubly crenate, base rounded or cordate, spikes stout dense, whorls confluent, bracts minute, calyx tubular angled glabrous or sparsely hairy, teeth subulate ciliate or not. *Wall. Cat.* 2328 ; *Wight Ic.* t. 1443.

NILGHIRI and ANAMALLAY HILLS ; on the outskirts of woods, alt. 7–8000 ft.

Stem 2–3 ft., woody. *Leaves* 2–3 in., sometimes nearly as broad, sparsely hairy above and beneath ; petiole 1–1$\frac{1}{2}$ in. *Spikes* 3–5 in. by 1 in. or less. *Calyx* sessile, membranous, $\frac{1}{10}$ in. and under, teeth very narrow. *Corolla-tube* not exserted. *Filaments* $\frac{1}{3}$ in., glabrous.

23. **P. travancoricus,** *Beddome Ic. Pl. Ind. Or.* t. 159 ; quite glabrous, leaves long-petioled ovate doubly crenate subacute, base rounded or cuneate, racemes lax-fld., flowers pedicelled reflexed, whorls few-fld., bracts minute or 0, calyx terete glabrous, teeth triangular not ciliate.

TRAVANCORE ; Attraymallay Ghat, alt. 4000 ft., *Beddome.*

Stem woody below, branches smooth and racemes black when dry. *Leaves* 1–2 in. ; petiole $\frac{1}{2}$–1 in., slender. *Racemes* 3–6 in., tapering upwards. *Calyx* $\frac{1}{4}$ in., pedicel half its length. *Corolla* funnel-shaped, tube exserted, lobes pubescent. *Filaments* $\frac{1}{3}$ in., glabrous.

24. **P. reflexus,** *Benth. in DC. Prodr.* xii. 155 ; branches stout densely shortly tomentose with reflexed hairs, leaves long-petioled ovate or ovate-cordate subacute doubly crenate, spikes villous dense-fld., whorls confluent or lower distinct, bracts minute, flowers sessile spreading or reflexed, calyx densely hirsute or villous terete, teeth triangular-subulate ciliate.

CEYLON ; higher parts of the island, alt. 5000 ft., *Mackenzie, Walker,* &c.

Erect, branched, woody below. *Leaves* 2–3 in., pubescent above, velvety beneath, base cordate rounded or acute ; petiole stout, $\frac{1}{2}$–1 in. *Spikes* 2–4 in., $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Calyx* $\frac{1}{4}$ in., sessile. *Corolla-tube* shortly exserted, lobes sparsely pubescent. *Filaments* $\frac{1}{3}$ in., glabrous or nearly so.

25. **P. brachystachys,** *Benth. in DC. Prodr.* xii. 156 ; low, procumbent below, much branched, branches pubescent with reflexed hairs, leaves small ovate subacute doubly crenate hirsute or finely tomentose, spikes narrow dense villous, whorls confluent or the lower separate, bracts minute linear, calyx minute hirsute or hispid, teeth subulate ciliate.

KHASIA MTS., alt. 4–6000 ft. ; *Griffith, Mack,* &c. ASSAM ; Naga Hills to N. Burma, *Griffith.*

A low, straggling, much-branched species, procumbent and rooting below, variable in hairiness. *Leaves* 1–2 in., very variable in form, rarely oblong-lanceolate. *Spikes* 1–4 in., narrow, very dense-fld. *Calyx* sessile, $\frac{1}{12}$ in. *Corolla* very small, dull purple ; tube hardly exserted ; lobes hirsute. *Filaments* $\frac{1}{6}$ in., glabrous or nearly so.—The specific name is not very appropriate.

13. DYSOPHYLLA, *Blume.*

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in very dense long spikes formed of many- and dense-fld. cymes (whorls). *Calyx* very

minute, ovoid, equal, 5-toothed, throat naked within. *Corolla* minute, tube exserted or included; limb equally 4-fid; upper lobe entire or 2-fid, lower spreading. *Stamens* 4, exserted, straight or subdeclinate; filaments very long, bearded; anther-cells confluent. *Disc* equal, subentire. *Style* 2-fid. *Nutlets* smooth or rough, ovoid or oblong.—Species about 12, Tropical Asiatic and Australian.

* Calyx-tube terete or obscurely angled.

† *Leaves opposite.*

1. **D. myosuroides,** *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 157, and in *DC. Prodr.* xii. 156 (*all in part*); perennial, erect, silkily tomentose, branches woody, leaves subsessile linear-oblong obtuse denticulate, spikes very slender 3–5 in. by ⅛ in. diam. tomentose, calyx-teeth very short triangular. *Wall. Cat.* 1547; *Dalz. & Gibs. Bomb. Fl.* 208. Mentha myosuroides, *Roth Nov. Sp.* 257. M. venulosa, *Herb. Heyne.*

DECCAN PENINSULA, *Heyne, Wight*; Bababoodan Hills and Copper Mts., Bellary, *Law, Stocks.*

Stem erect, 8–12 in., from a large woody rootstock, terete. *Leaves* 1–1½ by ⅛–⅓ in., thick, silkily pubescent on both surfaces. *Spikes* very slender, shortly peduncled, flexuous. *Calyx* $\frac{1}{24}$ in., densely tomentose, fruiting hardly enlarged, teeth erect in fruit. *Corolla* minute, glabrous; tube included. *Nutlets* ellipsoid, compressed, granulate.—Bentham's var. bracteata is founded on a young spike with the bracts protruded.

2. **D. rugosa,** *Hook. f.*; perennial, erect, appressed, fulvous-woolly, branches woody, leaves subsessile linear-oblong obtuse subentire, spikes slender 2 in. by ¼ in. diam. tomentose, calyx-teeth very short triangular. D. myosuroides, *Benth. ll. c. in part.* Mentha rugosa, *Herb. Heyne.*

DECCAN PENINSULA; Mountains of Tinnevelly, *Beddome*; at Pallamcotta, *Heyne.*

Very closely allied to *D. myosuroides*, and confounded with it by Wallich and Bentham; of the same size and habit, but not at all silky; form of leaves the same, but nerves more spreading, spikes much shorter and thicker.—Heyne seems to have distinguished the two from the names quoted by Wallich, of which that of *M. rugosa* is attached to a specimen in Rottler's Herbarium, no doubt collected by Heyne himself.

3. **D. salicifolia,** *Dalz. mss.*; stem and young leaves appressedly pubescent or silky, leaves sessile or petioled linear-lanceolate subentire or remotely serrate, spikes slender 2–4 in. villous, calyx villous short, teeth triangular almost equalling the tube. Dysophylla sp. 3, *Herb. Ind. Or. H. f. & T.*

The CONCAN; Mahableshwur Hills, *Gibson*; Hingregee Watercourse, Belgaum, *Ritchie*; Bombay, *Dalzell.*

Stem 1–2 ft., much branched; branches slender, erect, woody. *Leaves* 1–3½ in., rather membranous. *Spikes* ⅛–¼ in. diam., on slender peduncles; whorls confluent. *Calyx* in fruit $\frac{1}{12}$ in., with erect teeth. *Corolla-tube* exserted, lobes sparsely hairy. *Nutlets* ellipsoid, obtusely 3-gonous, shining.

4. **D. auricularia,** *Blume Bijd.* 826; annual, hirsute or villous, leaves sessile or shortly petioled oblong serrate, spikes 2–3 in. villous, calyx-teeth triangular incurved in fruit. *Benth. Lab.* 158, *in Wall. Pl. As. Rar.* i. 30, and in *DC. Prodr.* xii. 156; *Wall. Cat.* 1548; *Wight Ic.* t. 1445; *Grah. Cat. Bomb. Pl.* 150. Mentha auricularia, *Linn. Mant.* 81; *Roxb. Fl. Ind.* iii. 4; *Griff. Notul.* iv. 200. M. fœtida, *Burm. Fl. Ind.* 126.

From SIKKIM and ASSAM through E. BENGAL to PENANG and SINGAPORE. DECCAN PENINSULA, from Goa southwards. CEYLON.—DISTRIB. East to S. China, Borneo and the Philippines.

A coarse annual, 1–2 ft.; hairs often shaggy, spreading. *Leaves* 1–3 in., acute or obtuse; petiole rarely ½ in. *Spikes* ⅙–⅓ in. diam., pedicelled; whorls all confluent. *Calyx* not 1/24 in., enlarged in fruit. *Corolla* 1/10 in., usually pink; tube slender, far exserted; lobes hairy. *Filaments* very villous. *Nutlets* ellipsoid, nearly smooth.—Some very villous specimens from S. India and Ceylon have stouter spikes and white flowers, and may prove to belong to a distinct form.

†† *Leaves in whorls of three or four* (*rarely more*).

5. **D. quadrifolia,** *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 158, and in *DC. Prodr.* xii. 157; perennial, erect, tomentose, subsilky or pubescent, leaves 4 in a whorl, shortly petioled linear or linear-oblong acute or obtuse serrate or subentire, spikes elongate tomentose or pubescent, base often interrupted. *Wall. Cat.* 1539. D. velutina, *Benth. in Wall. Cat.* 1538. D. linearis, *Wall. Cat.* 1540. D. rupestris, *Dalz. in Hook. Kew Journ.* iii. 120; *Dalz. & Gibs. Bomb. Fl.* 208. Mentha quadrifolia, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 4. M. quaternifolia, *Heyne in Herb. Rottl.*; ? *Roth Nov. Sp.* 256. Chotellia sericea, *Opiz & Corda in Flora*, 1830, 35.

KHASIA MTS.; on rocks by streams, alt. 3–6000 ft. CHITTAGONG, alt. 300 ft., *Clarke*, to TENASSERIM, *Wallich*. SOUTH CANARA; on dry rocks, Malwar, *Dalzell*, &c., from the CIRCARS and CONCAN to MYSORE and the Anamallay Hills, *Heyne*, &c.; Anamallays, *Beddome*.

A stout undershrub, 2–4 ft., with a woody rootstock; stem simple or branched. *Leaves* very variable, 1–4 by ⅛–½ in.; petiole very short. *Spikes* 4–8 in., ¼–⅓ in. diam. *Calyx* sometimes glabrate, teeth triangular.—Order of chamomile (*Dalzell*).

6. **D. cruciata,** *Benth. in Wall. Pl. As. Rar.* i. 30, and *Cat.* 1541; *Lab.* 158, and in *DC. Prodr.* xii. 157; hirsute, stem simple erect, leaves 3–6 in a whorl sessile linear obtuse, margins revolute quite entire, spikes villous. D. tetraphylla, *Wight Ic.* t. 1444. Mentha quadrifolia, *Don Prodr.* 113. Dysophylla, *Griff. It. Notes*, 80, n. 1165.

SUBTROPICAL HIMALAYA, from Kumaon, alt. 5000 ft., *Royle*, &c., to Nepal, *Wallich*. KHASIA MTS., alt. 2-4000 ft.; *Griffith*, &c. NILGHIRI HILLS; *Wight*.

Stem 12–18 in., stout, strict. *Leaves* 1–1½ in., suberect. *Spikes* sometimes 5 in., ⅓ in. diam.; whorls confluent. *Calyx* villous. *Corolla-tube* scarcely exserted, lobes glabrous.

7. **D. linearis,** *Benth. in DC. Prodr.* xii. 157; annual, stem erect simple and leaves sparsely hairy or glabrate, leaves sessile 4 in a whorl linear or linear-lanceolate obtuse, margins revolute entire or sparingly toothed, spikes short, calyx glabrous.

KHASIA HILLS, alt. 4–6000 ft., in swamps and rice-fields; *Mack, H. f. & T., Clarke*.

Habit of *D. cruciata*, but nearly glabrous, with very different spikes, ½–2 in. long and ¹–⅔ broad, and corolla and nutlets twice as large.

8. **D. verticillata,** *Benth. in Wall. Pl. As. Rar.* i. 30, and *Lab.* 159, and in *DC. Prodr.* xii. 157; annual, erect, branched, glabrous or very sparsely hairy, leaves 4–10 in a whorl linear quite entire or obscurely toothed, spikes sometimes whorled tomentose or villous, teeth of fruiting calyx stellately spreading. *Wall. Cat.* 1544; *Thwaites Enum.* 239, *excl. syn.* D. ramosissima, *Benth. in Wall. Cat.* 1543. D. Benthamiana,

Hance in Ann. Sc. Nat. Ser. 5, v. 234. Mentha stellata, *Lour. Fl. Cochinch.* 36. M. verticillata, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 5. Pogostemon verticillatus, *Miq. Fl. Ind. Bat.* ii. 965.

BENGAL, SILHET, RANGOON and TENASSERIM, in swamps and rice-fields. CEYLON; *Rottler, Thwaites.*—DISTRIB. Malay Archipelago, China, Philippine Islands, Australia.

Very variable, sometimes 2 ft. high, excessively branched, with stem as thick as the thumb, at others very slender (var. ? *gracilis*, Benth.), subsimple, with stem as thick as a crow-quill; branches erect. *Leaves* 1–3 in., rarely $\frac{1}{4}$ in. diam., spreading and deflexed. *Spikes* 1–3 in., $\frac{1}{4}$ in. diam. *Calyx* very conspicuous in fruit from the spreading teeth.

9. **D. crassicaulis,** *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 159, and in *DC. Prodr.* xii. 158; annual, glabrous, decumbent below, leaves 4–6 in a whorl sessile linear or linear-oblong or -lanceolate obtuse subentire or serrate, spikes elongate glabrate or pubescent, calyx campanulate, teeth erect or conniving in fruit. *Wall. Cat.* 1545.

N.W. HIMALAYA, in swamps; Kashmir, Chumba and Kulu, alt. 2–4000 ft., *Jacquemont, Thomson, Clarke.* SIKKIM; *Herb. Griffith, J. D. H.* BENGAL; ASSAM, SILHET and KHASIA MTS., *Wallich,* &c.

Very similar to *D. verticillata,* and similarly variable, best distinguished by the larger flowers, more glabrous calyx with teeth that do not spread stellately. *Leaves* rounded subcordate or acute at the base, very variable in breadth. *Bracts* oblanceolate. *Calyx* $\frac{1}{18}$ in., lobes triangular, fruiting $\frac{1}{10}$ in. *Corolla-tube* exserted, lobes nearly glabrous. *Nutlets* very small, orbicular, compressed, pale, shining.

VAR. *pumila*; dwarf, spikes $\frac{1}{2}$-1 in., calyx more hairy. D. pumila, *Benth. ll. c.*; *Wall. Cat.* 1546. Mentha pumila, *Grah. in Edinb. New Phil. Journ.* 1828, 393. M. verticillata, *Don Prodr.* 114; *Hook. Bot. Mag.* t. 2907.

10. **D. Helferi,** *Hook. f.*; annual, dwarf, erect, glabrous, leaves few 4 in a whorl sessile linear or oblong serrate, spikes short pubescent, calyx-teeth lanceolate erect in fruit.

TENASSERIM; East Pagoda, *Helfer.*

Stem a span high and under, very slender; branches slender, spreading. *Leaves* $\frac{1}{2}$–1 in. *Spikes* $\frac{1}{2}$–$1\frac{1}{2}$ in.; bracts minute, linear-lanceolate. *Calyx* (fruiting) $\frac{1}{12}$ in., campanulate, membranous, sparsely pubescent. *Corolla* not seen. *Nutlets* very minute, orbicular-oblong, dark chestnut, shining.

††† *Annuals. Leaves in whorls of* 5 *or more, sessile, very narrow, quite entire* (see also sp. 5, 8 and 9).

11. **D. stellata,** *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 159, and in *DC. Prodr.* xii. 158; stem decumbent or creeping below much branched, branches short densely leafy hairy, internodes very short, leaves many in a whorl very short narrowly linear obtuse, margins revolute, spikes slender tomentose, bracts linear or clavellate equalling the flowers, flowering calyx $\frac{1}{30}$ in. hemispheric, teeth short erect or incurved in fruit. *Wall. Cat.* 1542; *Bot. Reg.* 1845, t. 23; *Grah. Cat. Bomb. Pl.* 150; *Dalz. & Gibs. Bomb. Fl.* 209. Mentha stellata, *Ham. in Roxb. Fl. Ind.* iii. 5. M. malabarica, *Herb. Heyne.*

DECCAN PENINSULA; from Belgaum southwards, in rice-fields.

Branches numerous, ascending, flexuous, stout, leafy to the base with close-set whorls. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., rarely $\frac{1}{10}$ in. broad, base obtuse, upper often pubescent. *Spikes* 1–2 in., $\frac{1}{6}$—$\frac{1}{4}$ in. diam., bracteoles filiform or clavellate. *Calyx* $\frac{1}{30}$–$\frac{1}{20}$ in., cupular or obconic, very variable, a little enlarged in fruit. *Corolla-tube* very short, lobes hirsute. *Nutlets* very small, shining.—The differences between the extreme

forms of fruiting calyx are great, and possibly indicate two species; in some specimens it is almost campanulate with erect teeth, in others almost globose with incurved teeth.

12. **D. tomentosa,** *Dalz. in Hook. Kew Journ.* ii. 337; stout, erect, branched, softly pubescent all over with long hairs, internodes very short, leaves many in a whorl linear obtuse, margins revolute, spikes stout villous, bracts equalling the flowers linear, flowering calyx 1/12 in. subcampanulate. *Dalz. & Gibs. Bomb. Fl.* 208.

SOUTHERN CONCAN; Malwar, in rice-fields, *Dalzell.*

Probably a large hairy state of *D. stellata,* with spikes 1/3 in. diam. Young specimens are decumbent, old and large ones have the habit of *D. Stocksii* and *pentagona.*

13. **D. gracilis,** *Dalz. in Hook. Kew Journ.* ii. 377; stem erect stout or slender hairy or glabrate, internodes very short, leaves sessile 5–20 in a whorl narrowly linear obtuse, or subacute glabrous or hoary, margins revolute quite entire, spikes 1–2 in. slender villous, bracts equalling the flowers filiform, calyx 1/20 in. campanulate hemispheric and hardly enlarged in fruit with erect teeth. *Dalz. & Gibs. Bomb. Fl.* 208.

DECCAN PENINSULA; Sihadree Hills, near Phonda Ghat, *Ritchie, Dalzell.*

Very near *D. tomentosa,* with which it agrees in habit, but the spikes are more slender, and the calyx much smaller. The form of the bracts affords an inconstant character in this and in *D. stellata,* of which I suspect this is only a tall form. *Stem* 2–3 ft., sometimes as thick as a swan's quill. *Leaves* 1/4–1/2 in., often recurved. *Spikes* 1/6 in. diam. *Calyx* densely villous.—I do not find the toothing of the leaves described by *Dalzell.*

14. **D. erecta,** *Dalz. in Hook. Kew Journ.* ii. 337; stem erect tall hispidulous, leaves 9–12 in a whorl linear or almost filiform obtuse or acute glabrous or scaberulous, margins recurved, spikes slender pubescent, bracts very short equalling the calyx clavellate, calyx shortly campanulate, teeth obtuse erect. *Dalz. & Gibs. Bomb. Fl.* 208.

SOUTHERN CONCAN; margins of swamps, Malwar, *Dalzell.*

This is hardly distinguishable from *D. gracilis.* Dalzell's specimens (named by himself) are of two forms; one from very wet places has nearly simple flexuous stems, almost capillary lower leaves (evidently immersed), and linear obtuse glabrous upper ones 3/4 in. long, in whorls of about 12; the other, from drier places, is shorter, more robust, much branched, with scaberulous leaves 4–8 in a whorl, and spikes exactly like *D. stellata,* of which I suspect the species is a form.

** *Calyx-tube deeply* 5-*grooved, with* 5 *elevated ridges* (*all annuals, with sessile quite entire leaves*).

15. **D. pentagona,** *Clarke mss.*; slender, erect, nearly glabrous, leaves 4 in a whorl linear obtuse, spikes slender pubescent, calyx densely pubescent all over, angles obtuse, mouth closed by the minute obtuse teeth.

CHOTA NAGPORE; at Songhboom, alt. 2000 ft., *Clarke.*

Stem 12–18 in., branches suberect. *Leaves* 1–1½ in., erecto-patent, base obtuse or acute. *Spikes* 2–3 in., 1/4–1/3 in. diam.; rachis hirsute; bracts linear. *Fruiting calyx* 1/18 in., nearly globose, pointed at either end; angles or wings thick. *Nutlet* solitary, linear-oblong, completely enveloped by the calyx-tube.

16. **D. Griffithii,** *Hook. f.*; slender, erect, nearly glabrous, leaves 4 in a whorl linear obtuse, spikes slender pubescent, fruiting calyx obconic acutely 5-angled, tube glabrous, lobes incurved villous.

ORISSA; at Sumbulpore, *Griffith*.

Habit and foliage of *D. pentagona*, but calyx very different, fruiting about $\frac{1}{12}$ in., chestnut brown and shining below, crowned with white bearded lobes. *Nutlets* 4, minute suborbicular.

17. **D. Stocksii,** *Hook. f.*; very stout, erect, nearly glabrous, leaves 9–20 in. a whorl narrowly linear obtuse, margins recurved, spikes slender, fruiting calyx densely pubescent all over, angles acute, mouth closed by the minute obtuse teeth.

The CONCAN; *Stocks*.

Stem as thick as a goose-quill, decumbent and closely annulate below, branches suberect. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., spreading. *Spikes* 2–3 in. by $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; rachis hairy; bracts filiform, tips clavellate. *Calyx* $\frac{1}{24}$ in., lobes as long as the tube, obtuse. *Corolla-tube* very short; lobes nearly glabrous. *Fruiting calyx* $\frac{1}{18}$ in., very concave between the angles. *Nutlet* solitary enclosed as in *D. pentagona*.

14. COLEBROOKIA, *Smith*.

A densely woolly hoary shrub. *Leaves* opposite or 3-nate, petioled, rugose, elliptic-oblong, crenulate. *Whorls* dense-fld. in panicled spikes, flowers small; bracts connate. *Calyx-tube* very short; teeth long, subulate, at length elongate, capillary and feathery. *Corolla* minute, tube short; limb very short, subequally 4-fid. *Stamens* 4, very short, included, equal, distant; anthers orbicular, cells confluent. *Disk* equal. *Style* 2-fid; lobes subulate. *Nutlets* hairy, obovoid.

C. oppositifolia, *Smith Exot. Bot.* ii. t. 111; *Benth. in Wall. Pl. As. Rar.* i. 29, *Lab.* 165, and in *DC. Prodr.* xii. 158; *Wall. Cat.* 1528; *Roxb. Fl. Ind.* iii. 26; *Kurz For. Fl.* ii. 277; *Gamble Darjeel. Timbers*, 63, and *Indian Timbers*, 300. C. ternifolia, *Roxb. Cor. Pl.* iii. 40, t. 245, and *Fl. Ind.* iii. 25; *Wall. Cat.* 1529; *Benth. ll. c.*; *Grah. Cat. Bomb. Pl.* 150; *Dalz. & Gibs. Bomb. Fl.* 209. Elsholtzia oppositifolia, *Poir. Dict. Suppl.* v. 663.

SUBTROPICAL HIMALAYA; from the Salt range and Peshawur to Sikkim, alt. 1–4000 ft. BEHAR, CENTRAL INDIA and the DECCAN PENINSULA to TRAVANCORE. TENASSERIM; *Helfer*.

Shrub, 5-10 ft. high; trunk stout; branches stout, terete, often whorled in threes. *Leaves* 4–8 in.; petiole stout, $\frac{1}{2}$–1 in. *Spikes* very numerous, 2–4 in. long, flowering $\frac{1}{4}$ in. diam., fruiting $\frac{1}{2}$ in. *Calyx* very minute, teeth in fruit $\frac{1}{8}$ in., tube deeply grooved, villous. *Corolla* white.

15. ELSHOLTZIA, *Willd.*

Herbs or undershrubs. *Leaves* opposite. *Whorls* in simple or panicled slender or stout terete or secund spikes; flowers minute; bracts various. *Calyx* 5-toothed, throat naked, fruiting erect often enlarged or inflated. *Corolla* small, tube straight or incurved; limb oblique or sub-2-lipped, 4-fid, upper lobe or lip erect, notched, the others spreading. *Stamens* 4, diverging or distant, filaments naked; anther-cells divaricate, or at length confluent. *Disk* much produced behind the ovary. *Style* subequally 2-fid, lobes subulate. *Nutlets* smooth or tubercled.—Species about 20, Temperate and Tropical Asiatic and Malayan, one of them also European.

* *Spikes panicled, cylindric or subsecund; bracts narrow, linear subulate or acicular. Nutlets shining.* Aphanochilus, *Benth.*

1. **E. flava,** *Benth. Lab.* 161, and in *DC. Prodr.* xii. 160; tall,

branches and petioles scaberulous, leaves large long-petioled ovate or rhombic-ovate caudate-acuminate toothed, spikes stout terete puberulous, corolla-tube twice as long as the calyx, fruiting calyx $\frac{1}{8}$ in. pedicelled tubular inflated below, teeth erect. Aphanochilus flavus, *Benth. in Wall. Pl. As. Rar.* i. 28, t. 34, and *Cat.* 1553.

TEMPERATE HIMALAYA; from Kumaon to Nepal, alt. 5–9500 ft. KHASIA MTS., alt. 5–6000 ft.

An annual bush, 3–5 ft.; branches obtusely 4-angled, sometimes muricate. *Leaves* 4–8 in., base cuneate rounded or cordate. *Spikes* axillary and terminal, 2–4 in., $\frac{1}{2}$ in. broad in fruit. *Bracts* ovate or lanceolate acute, deciduous. *Flowers* shortly pedicelled. *Corolla* yellow, puberulous. *Nutlets* ellipsoid, dark brown.

2. **E. polystachya,** *Benth. Lab.* 161, and in *DC. Prodr.* xii. 159; tall, branched, puberulous or hoary-pubescent, leaves subsessile lanceolate or elliptic-lanceolate acuminate serrate, spikes long slender, corolla villous, tube twice as long as the calyx, fruiting calyx $\frac{1}{6}$ in. pedicelled narrowly tubular curved, teeth erect. *Gamble Ind. Timbers*, 301. Aphanochilus polystachyus, *Benth. in Wall. Pl. As. Rar.* i. 27, t. 33, and *Cat.* 1554. Colebrookia oppositifolia, *Lodd. Bot. Cab.* t. 487. ? Perilla fruticosa, *Don Prodr.* 115.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–9000 ft., *Wallich*, &c. KHASIA MTS., alt. 4–5500 ft., *Griffith*, &c.

An annual bush, 3–4 ft.; branches obscurely 4-angled. *Leaves* 3–6 in., rather rigid, base acute, sometimes deeply toothed or crenate. *Spikes* 4–10 in., often fascicled, flowering $\frac{1}{3}$ in. diam., narrower in fruit; bracts minute. *Corolla* white, pubescent. *Fruiting calyx* ribbed to the base, with short triangular acute teeth. *Nutlets* narrow.—Bentham cites Don's *Perilla fruticosa*, but his description of the calyx with linear teeth and corolla with a very large midlobe of the lower lip is wholly at variance. Graham (*Cat. Bomb. Pl.* 150) gives "Chibler in the Surat collectorate as a habitat," which is very unlikely, and is not taken up in Dalzell and Gibson's Bombay Flora.

3. **E. Thompsoni,** *Hook. f.*; stout, densely tomentose, leaves subsessile lanceolate acuminate serrate, spikes leafy interrupted, corolla-tube shortly exserted, fruiting calyx $\frac{1}{5}$ in. pedicelled tubular straight woolly, teeth spreading.

OUDH; at Gadughat, *R. Thompson*.

Branches terete, very stout, with brown close short pubescence. *Leaves* 4–5 in., hard, scabrid above, almost woolly beneath. *Spikes* many, panicled, bracts leafy, buds woolly. *Corolla* pubescent. *Calyx* ribbed to the base; teeth short, broadly triangular. *Nutlets* linear-oblong.

4. **Beddomei,** *Clarke mss.*; hoary-tomentose, branches slender, leaves shortly petioled narrowly oblong-lanceolate obtuse crenulate, hoary on both surfaces, spikes long slender terete white-villous interrupted, corolla tomentose, tube incurved twice as long as the calyx.

TENASSERIM; Thougyeen forests, *Beddome*.

Shrubby? *Branches* nearly terete. *Leaves* 2–3 by $\frac{1}{3}$–$\frac{1}{2}$ in., rather thick, base entire narrowed into the petiole. *Spikes* 3–4 in., $\frac{1}{3}$ in. diam., very white; bracts minute, lanceolate; flowers $\frac{1}{6}$ in. long, sessile. *Calyx-teeth* lanceolate; fruiting not seen.

5. **E. blanda,** *Benth. Lab.* 162, and in *DC. Prodr.* xii. 160; slender, puberulous or hoary, leaves petioled elliptic-lanceolate acuminate serrate, spikes slender panicled one-sided, corolla-tube short, fruiting calyx

$\frac{1}{10}$ in. pedicelled urceolate glandular-pubescent, teeth erect lanceolate. Aphanochilus blandus, *Benth. in Wall. Pl. As. Rar.* i. 19, and *Cat.* 1550; *Bot. Mag.* t. 3091. ? Perilla elata, *Don Prodr.* 115. Mentha blanda, *Wall. mss.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3–7500 ft., *J. D. H.*, &c. KHASIA MTS., alt. 2–6000 ft., *De Silva*, &c. Tenasserim, *Beddome.*—DISTRIB. Ava, Sumatra.

Bushy, 2–5 ft. high; branches slender, obtusely 4-angled. *Leaves* 1–4 in.; petiole short. *Spikes* 2–5 in., flowering $\frac{1}{4}$ in. diam., fruiting broader, whorls lax or dense; bracts subulate-lanceolate. *Corolla* white, sparingly pubescent. *Fruiting calyx* short, mouth contracted. *Nutlets* broadly ellipsoid.—Bentham refers Don's *Perilla elata* to this, but the description of the leaves "scabrid above, tomentose beneath," does not agree. He also quotes "Arabia" on Forsköl's authority as a habitat, which is most improbable.

6. **E. incisa,** *Benth. Lab.* 162, and in *DC. Prodr.* xii. 161; puberulous, leaves long-petioled broadly ovate obtuse coarsely crenate-toothed, petiole winged above, spikes terete, flowering very slender terete, corolla-tube short, fruiting calyx urceolate $\frac{1}{6}$ in. sessile glandular-pubescent, teeth erect lanceolate. Aphanochilus incisus, fœtens & paniculatus, *Benth. in Wall. Pl. As. Rar.* i. 29, 30, and *Cat.* 1551, 1552, 1557. Perilla leptostachya, *Don Prodr.* 115. Hyptis stachyodes, *Link Enum.* ii. 106. Mentha paniculata, *Roxb. Fl. Ind.* iii. 4. M. blanda, *DC. Pl. Rar. Hort. Genev.* 27, t. 8.

TEMPERATE and SUBTROPICAL HIMALAYA; often in cultivated fields, from Kishmir to Mishmi, alt. 3-5000 ft. CHITTAGONG; *Roxburgh.*—DISTRIB. Ava.

A tender herb, 1–3 ft., branches 4-gonous. *Leaves* 1–2 in., membranous, base entire, cuneate, produced into the slender petiole, which is as long as the blade. *Spikes* panicled, 4–6 in., flowering $\frac{1}{6}$ in. diam., fruiting $\frac{1}{3}$ in.; bracts setaceous, often exceeding the flowers. *Corolla* minute, tube short, lobes glabrous. *Nutlets* ellipsoid.

VAR.? *major*; tall very stout, stem with soft spreading hairs, fruiting spikes very stout, $\frac{1}{2}$ in. diam., fruiting calyx $\frac{1}{6}$–nearly $\frac{1}{4}$ in.—Kumaon, near Dol, alt. 6500 ft., *Strachey.* Sikkim, at Ryang, alt. 6000 ft., *Clarke.*—I have seen only fruiting branches.

7. **E. Griffithii,** *Hook. f.*; hoary-pubescent, leaves short-petioled lanceolate subacute, spikes short terete dense-fld., calyx in flower narrow, teeth lanceolate, 2 upper much the longest.

UPPER ASSAM; Mishmi Hills, *Griffith.*

Habit of *E. incisa*, but leaves rigid, 1 by $\frac{1}{3}$ in., narrowed into a petiole not one-third the length of the blade. *Spikes* 1–2 in., flowering $\frac{1}{4}$ in. diam., very dense-fld.; bracts setaceous, exceeding the flowers. *Calyx* hoary-pubescent; fruiting not seen. *Corolla-tube* twice as long as the calyx, lobes pubescent.

8. **E. pilosa,** *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; coarsely hairy, leaves petioled ovate obtuse coarsely crenate, spikes subsolitary short stout terete dense-fld., bracts subulate awned ciliate longer than the flowers, fruiting calyx $\frac{1}{6}$ in. urceolate hispid, teeth lanceolate. Aphanochilus pilosus, *Benth. in Wall. Pl. As. Rar.* ii. 30, and *Cat.* 1556.

TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 5–7000 ft., *Wallich*, &c. KHASIA MTS., alt. 4–6000 ft.

A coarse herb, 1–2 ft.; stem stout or slender, hairs flaccid. *Leaves* 1–2 by $\frac{1}{2}$–$\frac{3}{4}$ in., membranous, base cuneate; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Spikes* 1–$1\frac{1}{2}$ in., stout both in flower and fruit, hispid, very dense-fld.; bracts rigid, with a stout pale midrib. *Calyx-teeth* very unequal. *Corolla* minute, lobes hairy.

** *Bracts rounded or broadly ovate, very short. Nutlets opaque.*

9. **E. densa,** *Benth. Lab.* 714, and in *DC. Prodr.* xii. 162; sparsely pubescent, leaves shortly petioled oblong-lanceolate or elliptic acute or obtuse serrate, spikes oblong or shortly cylindric villous, bracts short rounded, fruiting calyx $\frac{1}{4}$ in. broadly funnel-shaped inflated membranous, teeth short rounded. *Jacquem. Voy. Bot.* 127, t. 131. E. eriostachya, *Herb. Ind. Or. H.f. & T.*

WESTERN HIMALAYA and WESTERN TIBET; from Kumaon to Ladak, alt. 10–13,000 ft., *Jacquemont*, &c.

Annual, 6–18 in., branched from the base; stem slender to very stout, 4-angled. *Leaves* 1–3 in., rarely ovate or elliptic; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* 1–1$\frac{1}{2}$ in., or more and interrupted, fruiting $\frac{3}{4}$–$\frac{2}{3}$ in. broad; bracts shorter than the flowers. *Calyx*, flowering very minute, cupular; fruiting greatly enlarged. *Corolla* minute, villous, lilac, tube very short. *Nutlets* $\frac{1}{10}$ in. long, ellipsoid, opaque.

10. **E. eriostachya,** *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; softly hairy, leaves shortly petioled oblong or ovate-oblong obtuse denticulate, spikes solitary cylindric stout villous, bracts short ovate, fruiting calyx $\frac{1}{6}$ in. campanulate membranous, teeth minute triangular. E. Hoffmeisteri, *Klotzsch in Reise Pr. Waldem. Bot.* 105, t. 66. Aphanochilus eriostachya, *Benth. in Wall. Pl. As. Rar.* i. 29, and *Cat.* 155.

ALPINE HIMALAYA; from Kumaon, alt. 10–12,000 ft., *Blinkworth*, &c., Nepal, *Wallich*, to Sikkim, alt. 14–16,000 ft., *J. D. H.*

A strong-scented annual, 6–18 in., branched from the base, branches 4-angled suberect. *Leaves* 1–1$\frac{1}{2}$ in., sometimes tomentose beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Spikes* 1–2$\frac{1}{2}$ in., flowering $\frac{1}{6}$ in. fruiting $\frac{1}{2}$ in. diam.; flowers densely imbricate. *Calyx*, flowering $\frac{1}{20}$ in. *Corolla* very minute, yellow. *Nutlets* $\frac{1}{20}$ in., ellipsoid, opaque.

VAR. *pusilla*; dwarf, 3–6 in., stem usually simple, leaves $\frac{1}{4}$–$\frac{1}{2}$ in., fruiting calyx smaller. E. pusilla, *Benth. Lab.* 714, and in *DC. Prodr.* xii. 162.—Interior Himalaya; from Sikkim to W. Tibet, alt. 12–16,000 ft., and to 18,000 ft. in Rupchu, *Stoliczka.*

*** *Spikes cylindric; bracts broad, obcuneate, membranous, ciliate, forming together imbricating cups longer than the calyx.* CYCLOSTIGIA, *Benth.*

11. **E. strobilifera,** *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; sparsely hairy, leaves small petioled ovate obtuse crenulate or serrate, spikes villous or pubescent. Cyclostigia strobilifera, *Benth. in Wall. Pl. As. Rar.* i. 30, *excl. syn.*, and *Cat.* 1562.

TEMPERATE and ALPINE HIMALAYA; from Simla, alt. 5–10,000 ft., to Sikkim, alt. 6–14,000 ft.

Very variable, from a simple filiform stem 2 in. high, to a much-branched herb of 18 in.; stem and branches with usually a line of crisp hairs. *Leaves* $\frac{1}{2}$–1 in., rarely ovate and coarsely serrate; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Spikes* $\frac{1}{4}$–2 in., fruiting sometimes $\frac{1}{3}$ in. diam.; bracts imbricating all round the spike very broad, margin semicircular. *Calyx* hyaline, narrow-tubular, fruiting $\frac{1}{10}$ in., teeth lanceolate. *Corolla-tube* very slender, much longer than the calyx, lobes minute glabrous. *Nutlets* $\frac{1}{30}$ in., oblong, red-brown, not shining.

**** *Spikes completely one-sided; bracts large, secund, orbicular, cuspidate, closely imbricate, membranous, ciliate.* ELSHOLTZIA, *Willd.*

12. **E. cristata,** *Willd. Sp. Pl.* iii. 29; nearly glabrous, leaves long-petioled ovate- or elliptic-lanceolate acuminate coarsely serrate, spikes broad pubescent or villous, fruiting calyx $\frac{1}{4}$ in. tubular hairy. *Benth. in Wall.*

Pl. As. Rar. i. 29, and *Cat.* 1560; *Lab.* 164, and in *DC. Prodr.* xii. 163; *Bot. Mag.* t. 2560. Mentha ovata, *Cav. Ic.* 36, t. 360, f. 1. Hyssopus ocymifolius, *Lamk. Dict.* iii. 187. Perilla polystachya, *Don Prodr.* 115.

TEMPERATE and TROPICAL HIMALAYA; from Kashmir to Mishmi, alt. 1–9000 ft. WESTERN TIBET, alt. 9–11,000 ft. (Nilghiris, introduced.)—DISTRIB. N. Europe, N. Asia, China, Japan.

An erect fragrant herb, very variable in size, from 6 in. to 2 ft.; stem simple or branched. *Leaves* 1–3 in., membranous, base cuneate; petiole half as long as the blade or more. *Spikes* 1–3 in., fruiting $\frac{1}{2}$ in. diam. or less, rather villous; bracts shortly petioled, cusps acicular. *Calyx* minute in flower, in fruit vesicular, teeth triangular. *Corolla* pink or purplish, tube exserted, curved; limb villous. *Nutlets* $\frac{1}{18}$ in., oblong, smooth.—Some N. Chinese specimens are almost woolly.

DOUBTFUL SPECIES.

E. LEPTOSTACHYA, *Benth. Lab.* 713, and in *DC. Prodr.* xii. 160; *Cambess. in Jacquem. Voy. Bot.* 128, t. 32, from Kashmir (Jacquemont). I have seen no specimens. Bentham compares it with *E. polystachya*, from which the extremely slender spike distinguishes it, as do the distant whorls, and leaves contracted above the base. Is it an *Elsholtzia?*

16. **PERILLA,** *Linn.*

Herbs. *Leaves* opposite. *Whorls* 2-fld., in secund axillary and terminal simple or panicled racemes; flowers and bracts small. *Calyx* campanulate, 5-toothed; fruiting greatly enlarged, 2-lipped, base gibbous, upper lip dilated 3-toothed, lower of 2 lanceolate-subulate teeth. *Corolla-tube* short, throat bell-shaped, 5-fid. *Stamens* 4, subequal, erect, distant, hardly exserted; anther-cells distinct, parallel, at length diverging. *Disk* a large posticous gland. *Style* equally 2-fid. *Nutlets* subglobose, coarsely reticulate.—Species 1 (or 2), Eastern Asiatic.

P. ocimoides, *Linn.*; *Benth. Lab.* 166, *in Wall. Pl. As. Rar.* i. 29, and *Cat.* 1558, and in *DC. Prodr.* xii. 163; *Grah. Cat. Bomb. Pl.* 150; *Don Prodr.* 114; *Bot. Mag.* t. 2395. P. macrostachya, *Benth. in Wall. Cat.* 1559. Ocimum frutescens, *Linn. Sp. Pl.* ii. 832, *excl. syn. Rheede.* Melissa maxima, *Arduin Sp.* ii. 28, t. 13. Mentha perilloides, *Willd.*; *Lamk. Dict.* iv. 112; *Roxb. Fl. Ind.* iii. 7.

TROPICAL and TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 1–10,000 ft., common, often cultivated. KHASIA MTS., alt. 3–6000 ft.—DISTRIB. Burma, China, Japan.

A coarse aromatic often shaggy annual, 2–4 ft. *Leaves* 3–6 in., ovate or rounded, obtuse toothed serrate or coarsely crenate; petiole 1–3 in. *Racemes* 3–8 in., erect; bracts lanceolate. *Corolla* white, $\frac{1}{6}$ in. *Fruiting calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., villous. *Nutlets* $\frac{1}{20}$ in.—Some Japan specimens are nearly glabrous; others have fruiting calyx $\frac{1}{2}$ in., and nutlets nearly $\frac{1}{12}$ in.

DOUBTFUL SPECIES.

PERILLA FRUTICOSA, *Don Prodr.* 115, see under *Elsholtzia polystachya*, p. 643.
PERILLA ELATA, *Don Prodr.* 115, see *Elsholtzia blanda*, p. 643.

17. **MOSLA,** *Ham.*

Annual fragrant herbs. *Leaves* opposite. *Whorls* 2-fld., in terminal and axillary secund racemes; flowers and bracts very minute or the lower leafy. *Calyx* campanulate, 5-toothed, fruiting enlarged, subequal or 2-lipped, base gibbous; upper lip truncate or 3-toothed, lower of 2 longer teeth; throat closed with hairs. *Corolla-tube* naked or with a ring of hairs; lips

short, upper notched, lower 3-fid. *Stamens* 2, posticous, short, erect, distant; anther-cells 2, divaricate; staminodes 2. *Disk* a large posticous gland. *Nutlets* globose, smooth or reticulate.—Species 6, East Asiatic.

M. dianthera, *Maximovicz in Bull. Imp. Acad. Petersb.* ix. 430; slender, sparsely pubescent, leaves petioled ovate acute serrate, nutlets reticulate. M. ocimoides, *Ham. mss. in Benth. Lab.* 366. Hedeoma nepalensis, *Benth. Lab.* 366, and in *DC. Prodr.* xii. 244; *Dcne. in Jacquem. Voy. Bot.* 133, t. 138. Melissa nepalensis, *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2124. Moschosma ocimoides, *Reichb. in Wall. Cat.* 2712. Lycopus dianthera, *Ham. in Roxb. Fl. Ind.* i. 144. Cunila Buchanani, *Spreng. Syst.* i. 54. C. nepalensis, *Don Prodr.* 107.

Tropical and Temperate Himalaya and N. Bengal Plains; from Kashmir to Bhotan, alt. 1–6000 ft. Khasia Mts., alt. 0–5000 ft. Chittagong, *J. D. H. & T. T.*—Distrib. Burma, China.

A very strong-scented strict erect herb, 1–3 ft. *Leaves* 1–1½ in.; petiole ⅙–½ in. *Racemes* very slender, terminating the branches, lax-fld. *Corolla* ¼ in. long, white or purplish, tube short. *Fruiting calyx* ⅙ in., hemispherical. *Nutlets* as in *Perilla*.—The other described species are all extremely near *M. dianthera*, and perhaps forms of it.

18. MENTHA, *Linn.*

Strong-scented perennial herbs, rootstock creeping. *Whorls* many-fld., in axillary and terminal spikes, bracts various; flowers small. *Calyx* campanulate or tubular, 5-toothed, throat naked or villous. *Corolla* subequally 4-lobed. *Stamens* 4, equal, erect, distant; anther-cells parallel. *Style-arms* short. *Nutlets* smooth or reticulate.—Species about 25, N. temp. regions, introduced in many countries.

Mentha viridis, L. (spear-mint), *M. piperita*, L. (peppermint), *M. sativa*, L., and *M. aquatica*, L., occur in Indian gardens, and as escapes.

1. **M. sylvestris,** *Linn.*; leaves broadly or narrowly oblong obovate or lanceolate subacute serrate hoary beneath, whorls in terminal spikes, calyx-teeth triangular or lanceolate, corolla hairy glabrous within. *Benth. Lab.* 171, and in *DC. Prodr.* xii. 166; *Reichb. Ic. Fl. Germ.* t. 82.

Temperate Western Himalaya and Western Tibet; from Kashmir to Gurwhal, alt. 4–12,000 ft., *Royle*, &c.—Distrib. Affghanistan, Temp. Europe and W. and Central Asia.

Stem robust or slender, 2–3 ft., hoary-tomentose. *Leaves* 1–3 by ⅔–2 in., base rounded or cordate. *Spikes* 1–3 in., ⅓–½ in. diam.; bracts lanceolate; pedicels hairy. *Corolla* lilac, about ⅛ in. diam. *Nutlets* usually pale, smooth, sometimes brown and conspicuously delicately reticulate.

I have vainly endeavoured to find any character whereby to distinguish *M. incana* and *Royleana* from *M. sylvestris*, the only available one afforded by the calyx being excessively variable. Boissier unites them under one variety δ. *petiolata* (Fl. Orient. iv. 543), distinguished from *sylvestris* proper by the hoariness and petioled leaves, but I think the slender spike and usually minute calyx of *incana* are better varietal characters. Strachey and Winterbottom's specimens from Gurwhal (Niti, alt. 11,500 ft.) appear to be typical *M. sylvestris* with purplish calyces.

Var. *incana*; uniformly hoary-tomentose, spikes slender much interrupted, calyx very small, teeth short. M. incana, *Willd. Enum. Hort. Berol.* 609; *Benth. Lab.* 170, and in *DC. Prodr.* xii. 169.—Simla to Murree, Mooltan, *Edgeworth*.—Sometimes densely woolly. Peshawur specimens have small capitate spikes.

Var. *Royleana*; uniformly hoary-tomentose, spikes stout usually continuous, calyx-teeth lanceolate or triangular with subulate lips. M. Royleana, *Benth. in Wall. Pl. As. Rar.* i. 29, and *Cat.* 1537; *Lab.* 171, and in *DC. Prodr.* xii. 169.

2. **M. arvensis,** *Linn.*; hairy or glabrate, leaves shortly petioled or sessile oblong ovate or lanceolate serrate, whorls axillary capitate, calyx-teeth triangular or lanceolate. *Benth. in DC. Prodr.* xii. 171; *Boiss. Fl. Orient.* iv. 544.

WESTERN HIMALAYA; Kashmir, alt. 5–10,000 ft.—DISTRIB. Europe, N. and W. Asia to China.

Stem 1–2 ft. *Leaves* 1–2 in., obtusely or acutely serrate. *Bracts* acute, shorter than the flowers. *Calyx* hairy. *Corolla* hairy without and within.

VAR. *javanica*; leaves lanceolate, calyx-teeth longer, often exceeding the tube. M. javanica, *Blume Bijd.* 826; *Benth. l. c.* M. sativa, *Roxb. Fl. Ind.* iii. 6. M. arvensis, *Thwaites Enum.* 239.—Malacca, *Griffith*; Ceylon, *Gardner*, &c., borders of paddy-fields in the Central Province, *Thwaites*.—I suspect this is introduced, and is *M. sativa*, L., to which Boissier refers as a synonym to *M. arvensis*, L.

19. **LYCOPUS,** *Tourn.*

Marsh perennial herbs. *Leaves* toothed or pinnatifid. *Flowers* small in dense axillary whorls. *Calyx* subequally 4–5-toothed, throat naked. *Corolla* campanulate, subequally 4–5-fid. *Stamens* 2, distant; anther-cells parallel; staminodes 2. *Style* 2-fid, lobes flattened. *Nutlets* smooth, obovate, compressed, margins thickened.—Species 2, N. temp. regions and Australia.

L. europæus, *Linn.*; glabrous or puberulous, leaves sinuate-toothed or serrate, staminodes minute. *Benth. in DC. Prodr.* xii. 179; *Boiss. Fl. Orient.* iv. 545.

WESTERN HIMALAYA; Kashmir, alt. 1–6000 ft.—DISTRIB. Europe, W. N. and Central Asia.

Rootstock creeping or stoloniferous. *Stem* 1–3 ft. *Leaves* subsessile, elliptic-oblong, sometimes pinnatifid. *Corolla* blueish-white, dotted with purple, hairy within. *Nutlets* longer than the calyx-tube.

6877 VAR. *exaltata*; stouter, leaves more pinnatifid, staminodes capitellate. L. exaltatus, *Linn.*; *Benth. in DC. Prodr.* xii. 179; *Boiss. Fl. Orient.* iv. 545.—Kashmir, alt. 3–6000 ft.—Distrib. of *L. europæus*.

20. **ORIGANUM,** *Tourn.*

Aromatic herbs or undershrubs. *Leaves* entire or toothed. *Cymes* corymbose, bracts large, imbricating. *Calyx* 10–13-nerved, 5-toothed or 2-lipped; throat villous. *Corolla* obscurely 2-lipped, upper lip notched or 2-fid; lower spreading, 3-fid. *Stamens* 4, distant, ascending; anther-cells distinct, spreading. *Style-lobes* acute. *Nutlets* smooth.—Species about 25, of N. temperate regions.

The Marjoram, *O. Marjorana*, L. (O. Wallichianum, *Benth. in Wall. Cat.* 1565) is extensively cultivated in India.

O. vulgare, *Linn.*; erect, villous or glabrate, corymbosely branched, leaves broadly ovate. *Benth. in DC. Prodr.* xii. 193; *Boiss. Fl. Orient.* iv. 551. O. Watsoni, *T. A. Schmidt in Trim. Journ. Bot.* 1868, 234, t. 82, f. 5–7. O. normale, *Don Prodr.* 113; *Benth. in Wall. Pl. As. Rar.* i. 31, *in Lab.* 335, and in *DC. l. c.*; *Wall. Cat.* 1564. O. laxiflora, *Royle in Hook. Bot. Misc.* iii. 376; *Benth. Lab.* 336, and in *DC. l. c.* 194.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–12,000 ft.—DISTRIB. Europe, N. Africa, W. and N. Asia.

Stoloniferous, erect or prostrate; stem 1–3 ft. *Leaves* $\frac{1}{2}$–1 in., entire or toothed,

lower early withering. *Cymes* ¼–1 in., ovoid, 4-gonous; bracts green or purple, ovate, obtuse or acute. *Flowers* dimorphic, larger 2-sexual, purple, smaller ♀, paler. *Calyx-teeth* short. *O. laxiflorum*, Royle, is a prostrate state. *O. normale*, Don, has usually smaller less-coloured bracts, but intermediates are very common.

21. THYMUS, *Linn.*

Small, slender, much-branched shrubs, very aromatic. *Leaves* small, quite entire. *Cymes* few-fld., in dense or lax spikes, bracts minute; flowers small. *Calyx* 10–13-nerved, 2-lipped; throat villous. *Corolla* obscurely 2-lipped; upper lip straight, flattish, notched, lower 3-fid. *Stamens* 4, distant, straight, lower pair longer; anther-cells parallel or diverging. *Style-lobes* subulate. *Nutlets* nearly smooth.—Species about 50, of N. temperate regions.

T. Serpyllum, *Linn.*; branches prostrate or ascending, leaves ovate linear oblong or obovate obtuse. *Benth. in DC. Prodr.* xii. 200; *Boiss. Fl. Orient.* iv. 554. T. linearis, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 346, and in *DC. Prodr.* xii. 202; *Wall. Cat.* 1567.

Western Temperate Himalaya; from Kashmir to Kumaon, alt. 5–13,000 ft. Western Tibet, alt. 10–15,000 ft.; *Strachey & Winterbottom*, &c.—Distrib. Europe, N. Africa, W. and N. Asia.

Glabrous or hairy. *Rootstock* woody, stems or branches usually decumbent. *Leaves* ⅛–¼ in., short-petioled. *Whorls* capitate; flowers dimorphic, males largest. *Calyx-teeth* ciliate. *Corolla* ¼–½ in., purple, very variable.—Common Thyme.

22. HYSSOPUS, *Linn.*

An undershrub. *Leaves* sessile, obtuse, entire. *Whorls* 6–15-fld., secund, axillary and in terminal spikes. *Calyx* 15-nerved, 5-toothed, throat naked. *Corolla* 2-lipped; upper lip erect, flat, notched; lower spreading, 3-lobed, midlobe very broad. *Stamens* 4, exserted, diverging, lower longer; anther-cells linear, spreading. *Style-lobes* subequal, subulate. *Nutlets* narrow, nearly smooth, triquetrous.

H. officinalis, *Linn.*; *Benth. in DC. Prodr.* xii. 251; *Boiss. Fl. Orient.* iv. 584; *Reichb. Ic. Fl. Germ.* t. 1259.

Western Himalaya; from Kashmir to Kumaon, alt. 8–11,000 ft., *Falconer*, &c. —Distrib. E. Europe, W. Asia.

Usually glabrous; stem below branched, woody; branches 1–2 ft., erect or diffuse. *Leaves* sessile, oblong-linear or lanceolate. *Calyx*, fruiting ¼–⅓ in. long. *Corolla* blueish-purple.

23. MICROMERIA, *Benth.*

Herbs or undershrubs. *Leaves* usually small, entire or toothed. *Whorls* axillary or in terminal spikes, rarely panicled; flowers small. *Calyx* 13-nerved, 5-toothed or 2-lipped. *Corolla* 2-lipped; upper lip erect, flattish, entire or notched; lower spreading, 5-lobed. *Stamens* 4, lower longer ascending, incurved with diverging tips; anther-cells distinct, parallel, at length diverging, connective usually thickened. *Style-lobes* equal or upper very short, lower recurved flattened. *Nutlets* smooth.—Species about 60, all regions but Australia.

1. **M. capitellata,** *Benth. in DC. Prodr.* xii. 218; pubescent, stems tall slender erect, leaves entire or subserrate obtuse, whorls subglobose

distant in slender spikes, lower peduncled. M. Malcolmiana, *Benth. in Pl. Hohenack.* n. 1402; *Dalz. & Gibs. Bomb. Fl.* 209. Marrubium Malcolmii, *Dalz. in Hook. Kew Journ.* iv. 109.

BEHAR; or Parusnath, alt. 4500 ft., *Clarke.* WESTERN HIMALAYA; Dehra Doon, *Duthie.* WESTERN GHATS; from the Concan to the Nilghiris, *Wight,* &c.

Rootstock woody; stem 1–2 ft. *Leaves* ½–1 in., ovate or oblong, flat; floral small; petiole short. *Bracts* small. *Flowers* ⅛ in. *Calyx* villous; teeth long, subulate, erect; fruiting ⅙ in.—Very aromatic.

2. **M. biflora,** *Benth. Lab.* 378, and in *DC. Prodr.* xii. 220; glabrous, hairy or puberulous, stems short dense leafy, leaves small sessile ovate subacute, whorls axillary small flew-fld. *Dcne. in Jacquem. Voy. Bot.* 129, t. 134; *Wight Ill.* t. 176 *bis,* f. 5, and *Ic.* t. 1446. M. ovata, *Beck. in Schimp. Pl. Iter Abyss.* n. 12. Thymus biflorus, *Ham. in Wall. Cat.* 1556, *Don Prodr.* 112; *Benth. in Wall. Pl. As. Rar.* i. 31.

TROPICAL and TEMPERATE HIMALAYA (exclusive of Sikkim); from Kashmir to Bhotan, alt. 1–7000 ft. NILGHIRI and ANAMALLAY HILLS.—DISTRIB. Affghanistan, Arabia, Abyssinia, S. Africa.

Dwarf. *Rootstock* woody, stems or branches excessively numerous, 3–6 in., fastigiate, filiform. *Leaves* ⅙–¼ in., margins thickened. *Flowers* small, often solitary, pedicelled. *Calyx* hirsute, fruiting ⅙ in.; teeth subulate, very variable in length.

3. **M. hydaspidis,** *Falc. mss.*; *Benth in DC. Prodr.* xii. 224; pubescent, stem erect, leaves shortly petioled ovate obtuse subcrenate, whorls spicate many-fld. shortly peduncled, flowers pedicelled.

WESTERN KASHMIR; Jhelum Valley from Patlee to Nashga Valley, *Falconer.*

Stem 10–18 in., erect, rather stout, subsimple. *Leaves* ½–¾ in. *Spikes* continuous or interrupted. *Calyx* ¼ in. long, erect, puberulous; teeth lanceolate.

24. CALAMINTHA, *Moench.*

Herbs or shrubs. *Leaves* entire or toothed. *Whorls* dense and axillary or loose and panicled or spiked. *Calyx* 13-nerved, 2-lipped, upper lip 3-toothed, lower 2-fid, teeth narrower than of the upper; throat naked or villous. *Corolla-tube* straight, throat villous; upper lip erect, flattish; lower spreading, 3-lobed. *Stamens* 4 (or 2 upper imperfect), ascending under the upper lip; anther-cells parallel or diverging. *Style-lobes* equal, or the lower larger. *Nutlets* minute, subglobose, smooth, dry.—Species about 40, of N. temperate regions.

1. **C. Clinopodium,** *Benth. in DC. Prodr.* xii. 233; erect, softly hairy, whorls dense-fld., bracts filiform equalling the calyx, calyx-teeth subequal in length all very slender. *Boiss. Fl. Orient.* iv. 579; *Reichb. Ic. Fl. Germ.* t. 1274, f. 1. Melissa Clinopodium, *Benth. Lab.* 392. Clinopodium vulgare, *Linn.*

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4–12,000 ft.—DISTRIB. Europe, N. Africa, N. and W. Asia, Canada.

Rootstock woody, stoloniferous. *Stem* 1–3 ft., slender, subsimple. *Leaves* remote, 1–2 in., ovate, subacute, subcrenate. *Whorls* terminal and axillary, ¾–1 in. diam., depressed. *Calyx* ⅓ in. usually curved, hispid. *Corolla* ⅗–1 in., purple, hairy.—*Wild Basil.*

2. **C. umbrosa,** *Benth. in DC. Prodr.* xii. 232; procumbent, laxly hairy, whorls globose lax or dense-fld., bracts short or long, upper calyx-teeth with triangular teeth, lower with often longer subulate ones. *Boiss.*

Fl. Orient. iv. 578. C. Clinopodium, *var.* umbrosa, *Hook. f. in Thwaites Enum.* 239. C. repens, *Benth. in DC. l. c.* 233. C. nepalensis, *Fisch. & Mey. Ind. Sem. Hort. Petrop.* 1845, 53, n. 521. Clinopodium repens, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 13; *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2130. Thymus repens, *Don Prodr.* 113. Melissa umbrosa, *Bieb. Fl. Taur. Cauc.* ii. 63; *Benth. Lab.* 392; *Wight Ic.* t. 1447. M. repens, *Benth. Lab.* 392.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–12,000 ft. KHASIA MTS., alt. 4–6000 ft. WESTERN GHATS; from the Concan to the Anamallay Hills. CEYLON; at Newera Elia.—DISTRIB. Affghanistan, Caucasus, China, Japan, Java.

A very common and variable Indian plant with difficulty distinguishable in some states from *C. Clinopodium*, Wallich's Nepal specimens being as robust, and with equally long bracts, and calyx almost as large; but the habit is usually decumbent or procumbent, and more slender, the bracts shorter, calyces only $\frac{1}{6}$–$\frac{1}{4}$ in., their upper-lip segments shorter and more recurved. I am quite unable to distinguish *C. repens* from *C. umbrosa*; a diminutive form of it has very small calyces with short broad upper teeth sometimes strongly recurved. *C. nepalensis* is a very stout suberect Kashmir form with numerous often close-set and sometimes spicate whorls, short bracts and short calyx-teeth.

3. **C. longicaulis,** *Benth. in DC. Prodr.* xii. 234; erect or decumbent, softly hairy, whorls lax-fld. subsecund, bracts very minute, calyx-teeth short subequal in length not $\frac{1}{3}$ the length of the tube. Thymus piperitus & origanifolius, *Don Prodr.* 112. Clinopodium longicaule, *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2131. Melissa longicaulis, *Benth. Lab.* 395.

CENTRAL HIMALAYA; Nepal, *Wallich.*

Stem 2–3 ft., slender, woody below. *Leaves* $\frac{1}{2}$ in., quite entire or with a few crenatures. *Whorls* towards the ends of the branches, 2–6-fld.; bracts shorter than the calyx. *Calyx* $\frac{1}{3}$ in., hispid, glabrate or hairy within, teeth short. *Corolla* violet, tube slender, twice as long as the calyx.—A very distinct plant.

25. MELISSA, *Linn.*

Erect branched herbs. *Leaves* opposite, crenate. *Whorls* axillary, secund, lax-fld. *Calyx* 13-ribbed; lips small; upper flattish, 3-toothed; lower 2-toothed. *Corolla-tube* recurved and ascending; upper lip erect; lower flat, spreading, 3-lobed. *Stamens* 4, arching and meeting under the upper lip; anther-cells at length divaricate. *Style-lobes* subequal, subulate. *Nutlets* narrowly obovoid, smooth, dark.—Species 2 or 3, S. European and Asiatic.

1. **M. parviflora,** *Benth. Lab.* 394, *in Wall. Pl. As. Rar.* i. 65, and in *DC. Prodr.* xii. 241; leaves ovate or ovate-lanceolate acute, calyx $\frac{1}{4}$–$\frac{1}{3}$ in., corolla white, tube very short. *Wall. Cat.* 2825. Geniosporum axillare, *Benth. in Wall. Pl. As. Rar.* ii. 18; *Wall. Cat.* 2752.

TEMPERATE HIMALAYA; from Gurwhal, alt. 5–8000 ft., to Sikkim, alt. 7–10,000 ft., and Mishmi. KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Java.

Pubescent or glabrate. *Stem* tall, erect, angles hirsute. *Leaves* 1–4 in., base acute rounded or cordate; petiole $\frac{1}{4}$–1 in., slender. *Whorls* numerous, few- or many-fld.; flowers pedicelled. *Calyx-teeth* very variable in length of the acute points; bracts narrow. *Corolla-tube* scarcely exceeding the calyx.—Very near *M. officinalis*, which has its Eastern limit in Eastern Persia, but the leaves are more acute and the lower calyx-teeth are broader and shorter, but these are variable characters in the European plant.

2. **M. flava,** *Benth. Lab.* 394, *in Wall. Pl. As. Rar.* i. 65, and in *DC. Prodr.* xii. 241; calyx nearly ½ in., corolla yellow, tube longer than the calyx. *Wall. Cat.* 2126.

NEPAL, *Wallich*; KUMAON, alt. 7600 ft., *Madden, Strachey & Winterbottom.* BHOTAN, *Griffith.*

I much doubt this being more than a variety of *M. parviflora.* It is, however, a larger plant.

26. PEROWSKIA, *Karel.*

Erect, branched, strong-scented, rigid, hoary and scurfy, diœcious undershrubs. *Leaves* opposite, incised or crenate. *Whorls* small, distant, in simple or compound or panicled spikes, 2- or more-fld.; flowers small. *Calyx* short, terete; lips short, upper minutely 2–3-toothed, lower 2-toothed. *Corolla* 2-lipped, tube exserted, with a ring of hairs within, lower lip oblong entire, upper broad spreading erect 3-lobed. *Stamens*, 2 lower fertile, erect, diverging; 2 upper minute, imperfect; anther-cells linear, parallel. *Disk* swollen behind. *Style-lobes* acute. *Nutlets* pyriform, smooth, dry.—Species 4 or 5, Central Asiatic.—Genus of doubtful affinity.

1. **P. atriplicifolia,** *Benth. in DC. Prodr.* xii. 261; densely clothed with white stellate scurf, leaves oblong-ovate or lanceolate crenate-serrate or incised, calyx hispid. *Boiss. Fl. Orient.* iv. 589.

WESTERN TIBET, *Falconer*; Lahul, *Capt. Hay*; Karakoram and Iskardo, alt. 7500–10,200 ft., *Clarke.*—DISTRIB. Affghanistan and Beluchistan.

A rigid herb, 2–3 ft., paniculately branched. *Leaves* 1–2 in., rigid, rugose. *Whorls* 2–6-fld. *Calyx* ⅙ in. *Corolla* twice as long.—I doubt this being more than a form of the following.

2. **P. abrotanoides,** *Kiril. in Bull. Mosq.* 1841, 15, t. 1; densely or sparsely clothed with white or grey stellate scurf, leaves linear-oblong incised or pinnatisect, calyx clothed with long cottony wool. *Boiss. Fl. Orient.* iv. 389.

WESTERN TIBET, alt. 8–13,000 ft., *Thomson,* &c.—DISTRIB. Affghanistan, Persia, Turcomania.

A much-branched twiggy shrub or undershrub, 2–4 ft. high, woody below, with the habit of a *Lavandula.* *Leaves* 1–2 in., sometimes bipinnatisect, crenatures or lobes or segments obtuse.

27. MERIANDRA, *Benth.*

Shrubs smelling of sage, hoary or woolly. *Leaves* opposite, coriaceous, oblong, crenulate, rugulose above. *Whorls* many, dense-fld., large and in terminal broad spikes or small and in panicled calkin-like spikes with closely imbricating bracts; flowers small. *Calyx* ovoid, upper lip concave, subentire; lower 2-fid; throat naked. *Corolla-tube* short, equally 4-fid; lobes flat, upper entire or 2-fid. *Stamens* short, stout; 2 lower fertile erect distant, one or both of upper imperfect; anther-cells separate, stipitate, pendulous. *Style* 2-lamellate. *Nutlets* obovoid, smooth, brown.—The following are the only species.

1. **M. strobilifera,** *Benth. Lab.* 188, *in Wall. Pl. As. Rar.* i. 29, and in *DC. Prodr.* xii. 262; flocculently woolly, spikes 4-angled with imbricating appressed bracts. *Wall. Cat.* 1527; *Gamble Ind. Timbers,* 301.

WESTERN TEMPERATE HIMALAYA; on dry rocks from Simla to Kumaon, alt. 5–6000 ft.

A small shrub; branches obscurely angled. *Leaves* 3–4 by $\frac{3}{4}$–$1\frac{1}{4}$ in., obtuse or acute, base sagittate or cordate, upper surface almost granulate, lower white; petiole $\frac{1}{4}$ in., very stout. *Spikes* 1–2 in. by $\frac{1}{3}$ in. diam., panicled; bracts broadly ovate. *Calyx* $\frac{1}{10}$ in., woolly. *Corolla* rather longer, as much in diameter.

2. **M. bengalensis,** *Benth. Lab.* 189, *in Wall. Pl. As. Rar.* i. 29, and in *DC. Prodr.* xii. 262; finely tomentose or hoary, spikes terminal with interrupted ebracteate globose whorls. *Wall. Cat.* 1526; *Grah. Cat. Bomb. Pl.* 151; *Dalz. & Gibs. Bomb. Fl., Addend.* 66; *Dcne. in Jacquem. Voy. Bot.* 134, t. 139. Salvia bengalensis, *Roxb. Fl. Ind.* i. 145. S. dianthera, *Roth Nov. Sp.* 18. S. abyssinica, *Br. in Append. Salt's Travels.* S. Schimperiana, *Hochst. in Schimp. Iter Abyss.* n. 1781.

Cultivated in INDIA. DISTRIB. Native of Abyssinia.

A large straggling shrub; branches cylindric. *Leaves* 2–3 by 1–$1\frac{1}{4}$ in., finely crenulate, obtuse, thinner than in *M. strobilifera*, as finely granulate above and reticulate beneath, base rounded or bractate; petiole slender, $\frac{1}{4}$–$\frac{1}{2}$ in. *Whorls* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., villous. *Calyx* $\frac{1}{4}$ in. long, pedicelled, teeth acute. *Corolla* white, lips spreading or recurved.

28. SALVIA, *Linn.*

Herbs or shrubs. *Whorls* usually racemed or spiked; bracts small or large. *Calyx* tubular or campanulate, upper lip entire or 3-toothed, lower 2-fid, throat naked. *Corolla-tube* naked or with a ring of hairs inside; upper lip erect, lower 3-lobed, lateral lobes spreading. *Stamens*, 2 perfect, filaments short, jointed on the slender connective which bears 1 or 2 perfect cells. *Disk* tumid behind. *Style* ascending, 2-fid. *Nutlets* 3-quetrous, smooth.—Species 450, tropical and temperate.

Sect. 1. **Drymosphace,** *Benth.* Perennial herbs; floral leaves very small. *Upper calyx-lip* entire or 3-toothed. *Corolla-tube* exserted, annulate within; upper lip falcate, compressed. *Connectives* with an imperfect cell behind.

1. **S. glutinosa,** *Linn.*; herbaceous, tall, robust, viscidly hairy, leaves hastately ovate-oblong toothed, whorls distant few- and lax-fld., calyx tubular-campanulate, corolla large yellow. *Benth. in DC. Prodr.* xii. 276; *Reichb. Ic. Fl. Germ.* t. 1246, f. 1; *Boiss. Fl. Orient.* iv. 609. S. nubicola, *Benth. Lab.* 219, and in *Wall. Pl. As. Rar.* i. 68; *Sweet Brit. Fl. Gard.* t. 140; *Wall. Cat.* 2146.

TEMPERATE HIMALAYA; from Kashmir, alt. 6–9000 ft., to Sikkim, alt. 10–12,000 ft. DISTRIB. Affghanistan, S. Europe, W. Asia.

Stem 2–3 ft. *Leaves* 4–7 by 2–4 in.; petiole 1–3 in. *Flowers* in large branched spreading panicles, shortly pedicelled. *Calyx* $\frac{1}{2}$ in., upper lip ovate acute entire, teeth of lower ovate acute. *Corolla* 1–$1\frac{1}{2}$ in., tube exserted, throat dilated, limb gaping. *Nutlets* $\frac{1}{8}$ in., elliptic-obovate, compressed, smooth.

2. **S. hians,** *Royle mss. in Hook. Bot. Misc.* iii. 373, and *Ill. Pl. Himal.* 303, t. 75, f. 3; herbaceous, tall, robust, viscidly hairy, leaves long-petioled ovate-hastate or -cordate toothed, whorls distant few- and lax-fld., calyx broadly shortly campanulate, corolla very large blue. *Benth. Lab.* 219, 717, and in *DC. Prodr.* xii. 276; *Bot. Reg.* 1841 t. 39; *Bot. Mag.* t. 6517 (*excl. syn.* S. macrophylla ?).

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 8–11,000 ft., *Falconer*, &c.

Habit of *S. glutinosa*, but petioles much longer, often 10 in., and leaves rather broader; calyx much broader; corolla $1\frac{1}{2}$ in., blue with very inflated throat and shorter lips; nutlets similar but larger, $\frac{1}{6}$ in. long.

3. **S. campanulata,** *Wall. Cat.* 2143; herbaceous, robust, viscidly hirsute, leaves long-petioled ovate-cordate toothed, whorls few- and lax-fld., calyx broadly shortly campanulate, corolla large yellow. *Benth. in Wall. Pl. As. Rar.* i. 67, and in *DC. Prodr.* xii. 276.

SUBALPINE HIMALAYA; from Kumaon to Sikkim, alt. 9–13,000 ft., *Wallich*, &c.

Habit of *S. hians*, but leaves much broader with more cordate bases, and petioles equally long; calyx ½ in., gaping very wide; corolla-tube shortly exserted, inflated, lips very stout; nutlets the same.

Sect. 2. **Æthiopis,** *Benth.* Perennial herbs with large orbicular cuspidate floral leaves. *Upper calyx-lip* 3-toothed. *Corolla-tube* exserted, not annulate within; upper lip falcate, compressed; lower with the side lobes oblong often erect or twisted, midlobe rounded, *Connectives* connected by callous tips deflexed backwards, imperfect cell abruptly dilated.

4. **S. asperata,** *Falc. mss. ex Benth. in DC. Prodr.* xii. 282; stout, erect, branched, sparsely glandular and hispid, leaves oblong-ovate cordate obtuse crenate, whorls distant 6–10-fld., calyx broadly campanulate hispid. *Bot. Mag.* t. 4884.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5–6000 ft., *Falconer, Thomson.*

A harsh coarse herb. *Leaves* 3–6 by 2–3 in., petiole as long stout, floral orbicular 1 in. diam. and under, ciliate. *Calyx* ½ in. long, rigid, teeth spinous. *Corolla* ¾ in. long, white, tube short, slender; throat shortly inflated, upper lip long, narrow, arched, lower shorter. *Nutlets* $\frac{1}{10}$ in., subglobose.

5. **S. Moorcroftiana,** *Wall. Cat.* 2144; tall, robust, woolly, leaves long-petioled oblong or oblong-cordate obtuse doubly crenate and lobulate, whorls many distant 6–10 fld., calyx campanulate equally spinous-5-toothed scabrid. *Benth. in Wall. Pl. As. Rar.* i. 67, *Lab.* 228, and in *DC. Prodr.* xii. 286.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6–9000 ft.

Very robust; stem leaves beneath and often above petiole and branches of panicle usually thickly woolly, rarely glabrate. *Leaves* 6–12 by 3–5 in., thick, rugose, rarely acute, base rounded or cordate; petiole 4–8 in., stout, floral 1 in. diam. and under, white and rose-coloured. *Calyx*, flowering ⅓ in., fruiting ⅔ in. *Corolla* 1 in., rose-coloured, tube slender, upper lip long arched, very narrow. *Nutlets* subglobose.—The Ladak habitat given by Wallich is an error, for the plant is not Tibetan. Moorcroft no doubt collected it en route to Ladak.

6. **S. lanata,** *Roxb. Fl. Ind.* i. 147; robust, densely softly woolly, leaves sessile oblong or oblanceolate obtuse crenulate, whorls many distant, calyx campanulate 2-lipped subequally spinous-5-toothed. *Benth. in Wall. Pl. As. Rar.* i. 67, and ii. 11, t. 116, *Lab.* 228, and in *DC. Prodr.* xii. 286; *Wight Ic.* t. 325, and *Ill.* t. 176 *bis*, f. 3. S. integrifolia, *Hardw. in Asiat. Res.* vi. 349. S. cana, *Wall. Cat.* 2145. Stenarrhena lanata, *Don Prodr.* 111.

WESTERN TEMPERATE HIMALAYA; Kumaon to Murree, alt. 5–8000 ft.

Stems usually many from the root, 12–18 in. high, simple or branched. *Leaves* subradical, 6–8 by 1–1½ in., white beneath, narrowed at the base; floral ½ in. diam.; whorls distant, viscidly hairy, 6–8-fld. *Calyx*, flowering ¼ in., fruiting ⅓ in., glandular-hairy. *Corolla* ⅔ in. long, tube slender, throat inflated, upper lip about as long as the tube, lower small. *Nutlets* $\frac{1}{10}$ in., brown.

Sect. 3. **Plethiosphace,** *Benth.* Perennial herbs, floral leaves

small. *Calyx* ovoid-campanulate, upper lip recurved with 3 conniving teeth, lower acutely 2-toothed. *Corolla-tube* not annulate within; upper lip arched, lower with oblong lateral lobes and a rounded midlobe. *Connectives* deflexed behind, united by the callous tips, imperfect cell abruptly dilated.

7. **S. dumetorum,** *Andrz. in Rep. Enum. Pl. Volhyn.* 3, 40; hirsute tomentose or pubescent, lower leaves long-petioled ovate- or oblong-cordate doubly crenate rugulose above, floral rounded, whorls viscid distant 6-fld., calyx subsessile viscid. *Benth. in DC. Prodr.* xii. 290; *Ledeb. Fl. Alt.* i. 24.

WESTERN HIMALAYA; Kashmir, alt. 6000 ft., *Falconer, Clarke.*—DISTRIB. Volhynia, Podolia, Altai.

Stem 1–3 ft., very robust, tall and much branched in Kashmir specimens. *Leaves* 3-4 by 1½–2½ in., petiole of lower 1–4 in.; floral cuspidate, ⅛ in. diam. *Calyx*, flowering ¼ in. *Corolla* ½–⅝ in., blue, tube exserted, throat inflated.—Very near and perhaps only a variety of *S. pratensis*, L.

Sect. 4. **Notiosphace,** *Benth.* Herbs or shrubs with minute floral leaves. *Calyx* with the upper lip entire, or shortly 3-toothed, lower 2-fid. *Corolla* small, tube annulate within. *Connectives* distant in front, acute or bearing an empty anther.

8. **S. saxicola,** *Wall. Cat.* 2147; dwarf, subscapigerous, radical leaves long-petioled broad oblong or rounded cordate coarsely crenate, cauline few or 0, floral minute ovate, whorls distant or the upper crowded, calyx nodding, corolla very short. *Benth. in Wall. Pl. As. Rar.* i. 68, *Lab.* 310, and in *DC. Prodr.* xii. 355.

KHASIA MTS., alt. 4–6000 ft.; *Wallich*, &c.

Rootstock woody. *Leaves* 1–1½ in. diam., nearly glabrous; petiole 2–3 in., slender. *Scapes* 6–12 in., pubescent. *Calyx*, flowering ⅛ in., fruiting ¼ in., glandular-hairy. *Corolla* very short, pale purple, lips short. *Connective* with the antheriferous arm decurved, the other shorter, acute, *Nutlets* $\frac{1}{12}$ in., ellipsoid.

9. **S. plectranthoides,** *Griff. Notul.* iv. 199, and *Ic. Pl. Asiat.* t. 450; herbaceous, slender, sparsely hairy, leaves chiefly radical pinnate, segments few ovate or broadly oblong-cordate, terminal much the largest, lateral sessile or petiolulate, petiole very slender, scape long, spike simple, calyx nodding glandular-hairy. Plectranthus, *Griff. It. Notes*, 163, n. 845.

EASTERN HIMALAYA; Bhotan, near Panukka, *Griffith.*

Habit of a *Valeriana. Rootstock* rather slender. *Leaves* membranous, 3-5 in.; pinnules 2–5 pairs, terminal 2–3 in. long, base rounded or deeply lobed, lateral ovate-lanceolate. *Scape* or stem very slender, 18 in.; whorls few-fld. *Calyx* pedicelled, upper lip entire, lower 2-toothed. *Corolla* flesh-coloured; tube shortly exserted, hairy; upper lip arched, lower with small erect lateral lobes and an orbicular notched midlobe. *Connectives* recurved, barren arm obtuse.—Griffith's figure of this remarkable species represents a very stout plant with sessile leaflets; his specimens are very slender, with usually petiolulate leaflets. It is very near *S. japonica*, Thunb., differing only in the shorter calyx-teeth.

10. **S. plebeia,** *Br. Prodr.* 501; annual, stem stout erect hoary or scaberulous, leaves petioled oblong obtuse or upper ovate acute crenate, spikes panicled often fastigiate, whorls very numerous, upper calyx-lip entire, lower obtusely 2-toothed, stamens very small whitish. *Benth. Lab.* 309, and in *DC. Prodr.* xii. 355; *Dalz. & Gibs. Bomb. Fl.* 209. S. brachiata, *Roxb. Fl. Ind.* i. 145; *Wall. Cat.* 2149. ? S. parviflora, *Roxb. Hort. Beng.* 4.

S. minutiflora, *Bunge Enum. Pl. Chin. Bor.* 50. Ocimum fastigiatum, *Roth Nov. Sp.* 277. Lumnitzera fastigiata, *Spreng. Syst.* ii. 687.

Throughout INDIA, in the plains and ascending the hills to 5000 ft. (absent from Ceylon).—DISTRIB. China, Malay Islands, Australia.

Stem stout, 6–18 in., strict, fastigiately branched. *Leaves* 1–3 in., narrowed at both ends; floral small, lanceolate. *Calyx* pedicelled, $\frac{1}{8}$ in. *Corolla-tube* very short, not exserted, limb very small. *Nutlets* very minute, $\frac{1}{30}$ in. long, ellipsoid.

11. **S. ægyptiaca,** *Linn.*; a very dwarf scaberulous hispid or hoary much-branched undershrub, leaves few small subsessile linear or lanceolate acute rigid crenate, whorls remote 2–3-fld., flowers small, calyx glandular-hairy. *Benth. in DC. Prodr.* xii. 355; *Boiss. Fl. Orient.* iv. 631; *Jacq. Hort. Vind.* ii. 49, t. 108.

PANJAB PLAIN, from Delhi westwards, alt. 1–2000 ft.; *Jacquemont*, &c.—DISTRIB. Affghanistan, W. Asia, N. Africa to the Cape Verde Islands.

Branched from the base; branches straggling, divaricate, rigid. *Leaves* rarely 1 in. *Whorls* distant. *Calyx* nodding, pedicelled, ovoid-campanulate, fruiting $\frac{1}{4}$ in. long; upper lip orbicular minutely 3-toothed, teeth of lower subulate. *Corolla* and *stamens* as in *S. plebeia*. *Nutlets* $\frac{1}{12}$ in. long, narrowly oblong, nearly black.

VAR. *pumila*; more scabrid and hispid, leaves very rigid and rugose, calyx villous with long hairs. S. pumila, *Benth. Lab.* 726, and in *DC. Prodr.* xii. 356; *Dcne. in Jacquem. Voy. Bot.* 128, t. 133.—The Panjab plains and hills from Delhi westward; Scinde, *Stocks*; Affghanistan and Beluchistan.

12. **S. santolinæfolia,** *Boiss. Diagn. Ser.* 1, v. 13, and *Fl. Orient.* iv. 632; a dwarf much-branched hoary undershrub, leaves minute petioled linear pectinately lobed, lobes rounded, margins revolute, whorls 2–3-fld. on very slender spikes, flowers minute, calyx hispid with long hairs.

SCINDE; on the Boogtie Hills, *Vicary*.—DISTRIB. Affghanistan, Persia.

The specimens are flowerless and very insufficient, but I think referable to this curious little species. The calyx resembles that of *S. ægyptiaca*, var. *pumila*. Floral leaves persistent, elliptic, acute, $\frac{1}{10}$ in. long.

EXCLUDED AND UNKNOWN SPECIES.

S. INDICA, *Linn.*, is a Syrian plant, and not Indian, whence the name is changed by Boissier to *S. brachycalyx*.

S. ACAULIS, *Vahl Enum.* i. 157; *Benth. in DC. Prodr.* xii. 354 (S. ocimoides, *Roxb. in Wall. Cat.* 2148; *Benth. in Wall. Pl. As. Rar.* i. 68. S. lyrata, *Roxb. Hort. Beng.* 4, fid. *Wight in Herb.*), is only known as a plant cultivated in the Mission Garden by Rottler, and is doubtless not Indian; it has a long tubular corolla. Roxburgh says his *S. lyrata* is American.

S. GERARDIANA, *Benth. in Wall. Cat.* 2150, is the American *S. coccinea*, L. (see Wall. Cat., p. 92), cultivated in India.

29. **NEPETA,** *Linn.*

Erect or prostrate herbs. *Leaves* opposite. *Whorls* axillary or terminal; flowers blue, yellow or white. *Calyx* tubular, 15-ribbed, equally 5-toothed, or 2 lower teeth narrower. *Corolla-tube* not annulate within, throat inflated; upper lip straight, notched or 2-fid; lower 3-fid, midlobe largest. *Stamens* 4, ascending under the upper lip or exserted, upper pair longest; anther-cells diverging. *Style-lobes* subulate. *Nutlets* smooth.—Species about 120, Temp. Europe, N. Africa and Asia.

The following arrangement of the species of this troublesome genus is very artificial. I think that much better characters may be found in the corolla, but this would

require a careful re-examination of the whole genus. I suspect that some of the Indian species will prove identical with Persian. *Dracocephalum stamineum* & *Hookeri* should probably be transferred to *Nepeta.*

A. Whorls in simple terminal oblong or cylindric spikes, which are rarely interrupted at the base.—(The spikes of 13. *N. discolor* and others are occasionally interrupted; and species placed under C. occasionally present solitary simple spikes.)

* *Leaves bipinnatifid.*

1. **N. botryoides,** *Ait. Hort. Kew,* ii. 287; annual, branched, laxly hairy; leaves sub-2-pinnatifid, bracts linear-subulate, spikes cylindric dense-fld., calyx tubular straight. N. multifida, *Linn. Suppl.* 273. N. annua, *Pall. in Act. Petrop.* 1879, ii. 263, t. 12. N. bipinnata, *Cav. Ic. Rar.* i. 36, t. 49.

WESTERN TIBET; Rupchu, alt. 14,500 ft., *Thomson.*—DISTRIB. Soongaria, Altai.

Annual, 6–12 in., robust. *Leaves* ½–1 in., segments linear or oblong, obtuse. *Spikes* 1–3 in., flowers small. *Calyx* pedicelled, fruiting ¼ in. long, membranous, teeth mucronate. *Corolla* very small, yellow. *Stamens* short.

** *Leaves entire or crenate, sessile or subsessile.*

2. **N. linearis,** *Royle mss. ex Benth. in Hook. Bot. Misc.* iii. 377, *Lab.* 469, and in *DC. Prodr.* xii. 371; rootstock tuberous, stems ascending, leaves sessile linear acute or obtuse, spike ovoid or oblong, bracts lanceolate or subulate, calyx ¼ in. peduncled hairy, teeth spinescent.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Simla, alt. 7–11,000 ft., *Falconer,* &c.

Rootstock often as large as a walnut. *Stems* 6–18 in., stout, sparsely leafy, glabrous or puberulous. *Leaves* 1–3 by $\frac{1}{10}$–¼ in. *Spikes* 1–2½ in. *Calyx* tubular, fruiting ¼ in. or more. *Corolla-tube* twice as long, throat dilated, lips short.—Varies much in size of all parts.

3. **N. connata,** *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 469, and in *DC. Prodr.* xii. 371; tall, stout, glabrous or hairy, rootstock tuberous, stem simple, leaves sessile narrowly linear-lanceolate acuminate entire, base cordate, spike cylindric, lowest floral bracts large ovate aristate, upper narrow, calyx ½ in. pedicelled hairy, teeth very long-awned.

WESTERN TEMPERATE HIMALAYA; from Dalhousie to Kashmir, alt. 8–11,000 ft., *Falconer,* &c.

Stem 1–2 ft., sometimes as thick as a swan's quill, glabrous, rarely woolly. *Leaves* 3–6 by ⅙–¾ in., coriaceous, sometimes sinuate-toothed. *Spikes* 1–5 in., lower whorls sometimes axillary. *Calyx-teeth* as long as the tube, very slender. *Corolla* twice as long, blue. *Stamens* included. *Nutlets* $\frac{1}{12}$ in., orbicular, compressed-trigonous, brown, shining.

4. **N. eriostachya,** *Benth. Lab.* 734, and in *DC. Prodr.* xii. 371; stem subsimple sparsely hairy, leaves sessile broadly ovate or ovate-cordate obtuse crenate, lower floral similar, spike cylindric-oblong dense-fld. villous, calyx sessile ¼ in., teeth slender plumose.

WESTERN TEMPERATE HIMALAYA; Buspa Valley, *Jacquemont;* Kashmir, over Sonamurg, alt. 11,500 ft., *Clarke;* Gurwhal, alt. 11–12,000 ft., *Duthie.*

Stem ascending, 6–10 in. *Leaves* ½–¾ in., sometimes nearly as broad, pubescent beneath. *Spikes* 1–3 in. *Calyx* membranous, teeth as long as the tube. *Corolla* twice as long, bright blue. *Stamens* included.—I have not seen Jacquemont's

specimens. Clarke makes of his a var. *latibracteata* with broader bracts than Bentham describes. Habit of *Brunella.*

5. **N. nervosa,** *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 469, and in *DC. Prodr.* xii. 372; stem tall subsimple glabrous, leaves sessile or shortly petioled linear-lanceolate acuminate serrate, spike cylindric robust, bracts ovate or lanceolate mucronate, calyx sessile $\frac{1}{4}$ in., teeth very slender laxly villous. N. campestris, *Herb. Ind. Or. H.f. & T.*

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 6–10,000 ft., *Falconer, Jacquemont,* &c.

Rootstock long, woody. *Stems* 1–2 ft. *Leaves* 2–4 by $\frac{1}{3}$-$\frac{3}{4}$ in., base rounded or cordate. *Spike* stout, 1–3 in. *Calyx* membranous; teeth as long as the tube, filiform. *Corolla* twice as long, pale blue. *Stamens* included.

5913 VAR. *lutea;* flowers yellow.—Western Tibet; Karakoram, alt. 14,000 ft., *Clarke.*

6. **N. campestris,** *Benth. Lab.* 734, and in *DC. Prodr.* xii. 372; stem tall subsimple sparsely hairy, leaves sessile narrowly oblong-lanceolate subacute serrate, spikes slender, bracts all ovate mucronate, calyx sessile $\frac{1}{4}$ in., teeth very slender glabrous or ciliate.

WESTERN TEMPERATE HIMALAYA; from Kashmir, *Jacquemont,* to Kumaon, alt. 7–9000 ft., *Madden,* &c.

Closely allied to *N. nervosa,* but the leaves appear to be always sessile (which distinguishes it from *N. spicata*), the spikes are much longer and more slender, the calyx-teeth more glabrous and divergent, and the corolla-tube more slender.

7. **N. elliptica,** *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 470, and in *DC. Prodr.* xii. 373; stem branched villous, leaves subsessile elliptic oblong or oblong-cordate, tip rounded or acute pectinately crenate, spike long slender often interrupted, bracts ovate or lanceolate awned, calyx sessile $\frac{1}{4}$ in., teeth filiform ciliate as long as the tube. N. polystachya, *Benth. in Hook. Bot. Misc. l. c.*

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 5–8000 ft.

Stem 1–2 ft., often flexuous, usually woolly. *Leaves* $\frac{1}{2}$-1 in., tomentose. *Flowers* very much as in *N. nervosa.*

5985 8. **N. Thomsoni,** *Benth. mss.*; finely pubescent, stems short stout very leafy, leaves sessile or shortly petioled oblong-cordate obtuse or acute crenate, floral large, whorls in a dense ovoid or conical spike with large leafy crenate bracts, calyx $\frac{1}{4}$ in. scaberulous, teeth ovate-lanceolate much shorter than the tube.

WESTERN TIBET; Hanle, alt. 14,500–16,000 ft., *Thomson.* EASTERN TIBET; north of Sikkim, *J. D. H.*

Stem a span to a foot high, stout, simple or with simple ascending branches from the base. *Leaves* close set, 1–2 by $\frac{1}{2}$-$\frac{3}{4}$ in.; petiole rarely $\frac{1}{8}$ in.; floral similar. *Spike* of dense approximate superposed whorls with green elliptic bracts far exceeding the calyces. *Corolla* not seen. *Nutlets* large, nearly $\frac{1}{12}$ in., suborbicular.

9. **N. supina,** *Stev. in Mem. Soc. Nat. Mosq.* iii. 365; erect, branched, finely pubescent, leaves small sessile ovate obtuse crenate, floral subsimilar or narrow, whorls dense-fld., lower axillary, upper in an ovoid spike, bracts lanceolate, calyx $\frac{1}{3}$ in. curved narrow villous, mouth very oblique, teeth setaceous shorter than the tube, nutlets linear. *Benth. Lab.* 473, and in *DC. Prodr.* xii. 374; *Boiss. Fl. Orient.* iv. 462.

WESTERN TEMPERATE HIMALAYA; from Murree, *Fleming*, to Gurwhal, alt. 15,000 ft., *Strachey & Winterbottom*. WESTERN TIBET; Iskardo, alt. 12,000 ft., *Clarke*.—DISTRIB. Caucasus.

Stem 8–18 in. *Leaves* $\frac{1}{2}$–1 in., tomentose beneath. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Nutlets* nearly $\frac{1}{12}$ in. long, trigonous.—The largest Indian specimens are taller, stouter and more branched than the Caucasian, and the flowers are smaller, but the remarkable long narrow seeds are quite the same.

*** *Leaves distinctly petioled, entire or crenate.*

10. **N. spicata,** *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 470, and in *DC. Prodr.* xii. 372; stem erect branched glabrous hoary or pubescent, leaves petioled ovate- or triangular-cordate acute coarsely crenate or serrate, spike oblong or cylindric, bracts ovate or lanceolate awned, calyx sessile $\frac{1}{4}$ in. scabrid, teeth slender as long as the tube ciliate or hispid. *Wall. Cat.* 2083; *Bot. Mag.* t. 6405 (starved form). Betonica lævigata, *Don Prodr.* 110.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6–12,000 ft. —DISTRIB. Affghanistan.

Stem 1–3 ft., with often spreading branches. *Leaves* 1$\frac{1}{2}$–4 by $\frac{1}{2}$–3 in., glabrous or pubescent or hoary beneath; petiole 1–3 in. *Spike* 2–4 in., stout or slender, often interrupted; bracts very variable. *Flowers* as in *N. campestris*, pale blue.—Bentham's var. *elata* seems only a large state.

11. **N. lamiopsis,** *Benth. mss.*; stems ascending subsimple flaccid sparsely hairy, leaves few sessile or petioled broadly ovate-cordate obtuse coarsely crenate, floral large, whorls dense-fld., lower axillary, upper in ovoid spikes, bracts orbicular and green crenate or narrower or linear, calyx $\frac{1}{3}$ in. pubescent, mouth oblique, teeth slender diverging as long as the tube, nutlets broadly oblong.

ALPINE SIKKIM HIMALAYA; alt. 12–16,000 ft., *J. D. H.*

Stems succulent, 6–18 in. *Leaves* $\frac{1}{2}$–1$\frac{1}{2}$ in., flaccid; petiole 0–$\frac{1}{2}$ in., floral sessile *Axillary whorls* few, much shorter than the leaves, terminal in an ovoid spike $\frac{1}{2}$–1$\frac{1}{2}$ in.; bracts sometimes all linear. *Corolla* deep blue, tube twice as long as the calyx, limb small. *Nutlets* about $\frac{1}{14}$ in. long.—Habit of a *Lamium*.

12. **N. raphanorhiza,** *Benth. Lab.* 734, and in *DC. Prodr.* xii. 373; rootstock tuberous, stems weak ascending glabrous or villous, leaves small petioled broadly ovate or ovate-cordate obtuse crenate or toothed, spikes short ovoid, bracts ovate to lanceolate, calyx $\frac{1}{6}$ in. sessile, teeth lanceolate ciliate shorter than the tube.

WESTERN TEMPERATE HIMALAYA; Kashmir to Chamba, alt. 5–12,000 ft., *Jacquemont*, &c.—DISTRIB. Affghanistan.

Stems many from a globose black rootstock as large as a nut or walnut, diffuse or ascending, 6–18 in. high, simple or branched. *Leaves* $\frac{1}{2}$–1 in., sometimes nearly as broad; petiole half their length. *Spikes* 1 in. and less, pubescent or villous. *Calyx* smaller than in the preceding species, with shorter teeth. *Corolla* purplish blue, tube twice as long as the calyx, slender.—Roots eaten.

13. **N. discolor,** *Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 470, and in *DC. Prodr.* xii. 373; rootstock elongate, stems weak ascending glabrous or villous, leaves small petioled broadly ovate or ovate-cordate crenate, spikes ovoid or cylindric, bracts elliptic mucronate, calyx $\frac{1}{4}$ in. sessile villous, teeth filiform as long as the tube. N. Sabinei, *T. A. Schmidt in Trim. Journ. Bot.* 1868, 238, t. 82, f. 1–4.

WESTERN TEMPERATE and ALPINE HIMALAYA; from Kashmir to Gurwhal and WESTERN TIBET, alt. 10–15,000 ft.—DISTRIB. Affghanistan.

Closely resembles in habit and foliage large forms of *N. raphanorhiza*, but wants the tuberous rootstock, and has much longer spikes with long calyx-teeth as in *N. spicata*. *Leaves* often white with appressed tomentum beneath. *Flowers* white or pale blue.

14. **N. longibracteata,** *Benth. Lab.* 737, and in *DC. Prodr.* xii. 392; dwarf, diffuse, softly pubescent or woolly, leaves petioled fan-shaped or cuneate-obovate crenate or lobulate, spikes capitate with the cymes sessile amongst the crowded uppermost and long silky bracts, calyx ⅓ in. silky, teeth subequal nearly equalling the tube, stamens included, nutlets oblong. *Dcne. in Jacquem. Voy. Bot.* 132, t. 137.

ALPINE WESTERN HIMALAYA and WESTERN TIBET, alt. 14,000–17,000 ft.; *Falconer, Jacquemont*, &c.

Rootstock long, stout, excessively divided at the top; stems 3–6 in., suberect or prostrate, simple or branched. *Leaves* ½ in. long or broad or less, petiole about as long. *Heads* subglobose, 1 in. diam.; lower bracts fan-shaped, pectinate. *Corolla* twice as long as the calyx, blue, tube curved, funnel-shaped, limb small. *Stamens* included. *Nutlets* $\frac{1}{20}$ in.—Strongly aromatic, lemon-scented. Placed by Bentham in the *Glechoma* section. It very closely resembles the Siberian *Dracocephalum pinnatum* except in the calyx-teeth, which are, however, very variable in that plant.

B. Whorls all or mostly axillary, many, distant.

15. **N. glutinosa,** *Benth. Lab.* 735, and in *DC. Prodr.* xii. 377; glandular-pubescent, stem stout strict erect leafy, leaves small sessile ovate-cordate acute pectinately inciso-serrate, whorls few-fld., bracts linear-oblong aristate, calyx ⅓ in. pedicelled, teeth ovate mucronate much shorter than the tube.

WESTERN SUBALPINE HIMALAYA; Kashmir and WESTERN TIBET, alt. 11–13,000 ft., *Jacquemont, Thomson*, &c.

Strongly scented. *Stem* 1½–2 ft., stiff. *Leaves* ¾–1 in., sometimes ½-amplexicaul; floral often equalling the calyx. *Corolla* ¾ in. long, white or blue, tube curved, slender, limb small.

C. Whorls forming interrupted spikes, rarely solitary heads.

16. **N. mollis,** *Benth. Lab.* 734, and in *DC. Prodr.* xii. 378; softly tomentose, stem slender subsimple, leaves shortly petioled ovate-cordate obtuse crenate or subcrenate, whorls few-fld., bracts elliptic ovate or lanceolate awned, calyx ¼ in., mouth oblique, teeth lanceolate shorter than the tube softly hairy. Nepeta n. 23, *Herb. Ind. Or. H.f. & T.*

WESTERN TEMPERATE HIMALAYA; Marri, *Fleming*; Kashmir, alt. 8–9000 ft., *Jacquemont, Falconer, Thomson*, &c.

Rootstock elongate, woody. *Stems* 6–18 in., slender, sparingly leafy. *Leaves* 1–2 by ½–1 in., grey-tomentose; petiole ⅙–⅓ in. *Spikes* 3–8 in.; lower bracts (floral leaves) ovate or lanceolate, longer or shorter than the cymes, which are sometimes peduncled. *Whorls* white, softly hairy. *Calyx* villous, often decurved. *Corolla* rose-coloured, tube shortly exserted, limb small.

17. **N. distans,** *Benth. in Hook. Bot. Misc.* iii. 379, *Lab.* 475, and in *DC. Prodr.* xii. 378; softly tomentose, stem slender subsimple, leaves shortly petioled ovate-cordate obtuse crenate, whorls few-fld., bracts narrowly linear, calyx ¼ in. curved, mouth oblique, teeth lanceolate shorter than the tube glabrous or softly hairy.

WESTERN TEMPERATE HIMALAYA; Gurwhal, Mussorie and the Syen Range, *Royle*. Panjab Himalaya, *Falconer, Stewart*.

I doubt this being more than a form of *N. mollis* with narrow bracts and a longer more curved calyx.

18. **N. ciliaris,** *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 475, and in *DC. Prodr.* xii. 379; tall, erect, branched, softly densely tomentose, leaves shortly petioled ovate-cordate obtuse crenate, whorls secund dense-fld. in long interrupted villous spikes, upper crowded, bracts lanceolate, calyx ¼ in. curved villous, teeth slender shorter than the tube, nutlets broadly ellipsoid. *Wall. Cat.* 2082.

Western Temperate Himalaya, alt. 6–8000 ft.; from Kashmir to Gurwhal, *Royle, Jacquemont, Edgeworth.*

Stem 2–3 ft., strict. *Leaves* ¾–1½ in., sometimes almost as broad, lower floral large. *Spikes* 4–8 in., pale; whorls sometimes shortly pedicelled. *Corolla* very small, about ⅓ in., lilac, tube slender.—Very like *N. ruderalis*, but the inflorescence is more simple, the whorls rarely peduncled. Bentham describes the nutlets as minutely granular, but I find them smooth. Clarke doubts Royle's habitat of "road to Kashmir," and suspects that the species is confined to the Simla and neighbouring hills.

D. Whorls in branched panicles, some or all more or less peduncled.

* *Corolla less than ½ in. long.*

21. **N. ruderalis,** *Hamilt. mss.*; annual, erect or ascending, finely pubescent or hoary, leaves petioled broadly ovate- or orbicular-cordate obtuse crenate, whorls very dense-fld. subglobose in interrupted spikes villous, the lower peduncled, calyx ⅙ in. villous, mouth subequal, 3 upper teeth triangular aristate, 2 lower filiform, nutlets obscurely granulate. *Benth. Lab.* 475, *in Wall. Pl. As. Rar.* i. 64, and in *DC. Prodr.* xii. 381. N. secunda, *Wall. Cat.* 2122. N. calaminthoides, *Benth. in DC. l. c. in part.* N. clinopodioides, *Royle ex Benth. in Hook. Bot. Misc.* iii. 379, *Lab. l. c.*, and in *DC. Prodr. l. c.* 382. Glechoma erecta, *Roxb. Fl. Ind.* ii. 7. G. hindostana, *Roth Nov. Sp.* 258. G. indica, *Spreng. Syst.* ii. 727. Thymus nepetoides, *Don Prodr.* 113.

Tropical and Subtropical India; from the Indus to Behar, Central India and the Concan, ascending the Himalaya to 8000 ft.—Distrib. Affghanistan.

Stem 6–18 in., branched from the base, robust or slender, obtusely angled. *Leaves* ½–2½ in., green or hoary; petiole ¼–½ in. *Whorls* ½–1 in. diam., unilateral, depressed; peduncles sometimes 1 in.; flowers pedicelled. *Corolla* very small, ¼ in., purplish, tube shortly exserted. *Nutlets* $\frac{1}{28}$ in. long, broadly oblong. The granulation consists of more or less tumid separated areolæ, and is sometimes very indistinct.—*N. clinopodioides*, with a calyx less hairy and flowers smaller, is scarcely a variety, found on the Jumna by Royle. Woodrow sends from Poona a plant resembling *N. ruderalis* in habit, but with a large calyx and nutlets like *N. bombaiensis* (from which the calyx-teeth distinguish it).

22. **N. bombaiensis,** *Dalz. in Dalz. & Gibs. Bomb. Fl.* 209; erect, branched, tomentose or laxly villous, leaves long-petioled rounded ovate-cordate coarsely crenate, cymes all axillary few and lax-fld., peduncles equalling the petioles, flowers long pedicelled, calyx ¼ in. laxly hairy, 3 upper teeth broadly triangular acute much shorter than the tube, 2 lower subulate, nutlets nearly smooth.

The Concan; old walls and rocks at Swenere Fort, *Dalzell.*

Stem 1 foot. *Leaves* 2 in., green, sparsely hairy; petiole 1 in. *Cymes* 6–8-fld.; bracts at the base elliptic-lanceolate, acuminate, green. *Corolla* very small, pale blue, with purple spots. *Nutlets* ellipsoid, $\frac{1}{18}$ in. long.—A remarkable species, unlike

any other in habit, in the great size of the foliage and smallness of the long peduncled axillary cymes.

23. **N. Cataria,** *Linn.*; perennial, erect, branched, hoary-pubescent, leaves petioled ovate or ovate-cordate acute coarsely crenate or toothed, whorls in long narrow terminal shortly peduncled dense-fld. spikes, bracts subulate equalling the calyx or shorter, calyx $\frac{1}{4}$ in. curved pubescent, mouth oblique, teeth subequal subulate shorter than the tube, nutlets smooth. *Benth. in DC. Prodr.* xii. 383; *Boiss. Fl. Orient.* iv. 643; *Reichb. Ic. Fl. Germ.* xviii. t. 1242. N. calaminthoides, *Benth. in DC. l. c. in parts.* N. ruderalis, *var.* clinopodioides, *Herb. Ind. Or. H. f. & T.* N. ruderalis, *Boiss. l. c.* 644.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 1–5000 ft., *Falconer, Jacquemont, Thomson.*—DISTRIB. Affghanistan to W. Europe.

Stem 2–3 ft., leafy, acutely angled. *Leaves* 1–3 in.; petiole $\frac{1}{4}$–$\frac{3}{8}$ in. *Spikes* 4–10 in., narrow, strict, with 6–20 whorls or cymes; bracts of lower leafy, of upper reduced; flowers pedicelled. *Corolla* $\frac{1}{2}$ in., dotted with purple. *Nutlets* $\frac{1}{20}$ in., broadly oblong, smooth.

24. **N. leucophylla,** *Benth. Lab.* 476, and in *DC. Prodr.* xii. 381; slender, branched, erect or ascending, hoary-tomentose, leaves small shortly petioled ovate-cordate obtuse or acute crenate rugose above, whorls distant dense-fld. in very long narrow interrupted shortly peduncled terminal spikes, bracts subulate, calyx $\frac{1}{4}$ in. villous, mouth oblique, teeth lanceolate-subulate rather shorter than the tube, corolla very small, nutlets smooth. *Wight Ill.* t. 176 *bis*, f. 6.

WESTERN TEMPERATE HIMALAYA; Simla to Kumaon, alt. 6–8000 ft., *Royle, Edgeworth,* &c.

Stem 2–3 ft., obtusely angled, leafy. *Leaves* 1–1$\frac{1}{2}$ in.; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Spikes* as in *N. Cataria*, but more slender and villous. *Corolla* about twice as long as the calyx. *Nutlets* as in *N. Cataria.*

5967 25. **N. leucolæna,** *Benth. mss.*; erect, branched, white-tomentose, leaves small subsessile ovate acute or obtuse crenate, whorls distant in interrupted terminal spikes, the lower very shortly peduncled, bracts lanceolate, calyx $\frac{1}{3}$ in. woolly, upper teeth much shorter than the tube triangular, lower subulate much shorter, nutlets linear-oblong.

WESTERN TIBET; Zanskar and Ladak, alt. 12–13,000 ft., *Thomson.*

Stem 2–3 ft., nearly cylindric, leafy. *Leaves* $\frac{1}{3}$–1 in., furfuraceously tomentose on both surfaces, petiole 0–$\frac{1}{6}$ in. *Whorls* few-fld., the lower axillary. *Corolla* thrice as long as the calyx, tube curved, funnel-shaped; lips short. *Nutlets* $\frac{1}{18}$ in. long, smooth.—Habit of *N. ciliaris*, and perhaps referable to Section C, but the spikes which are not very advanced have pedicelled lower cymes.

26. **N. floccosa,** *Benth. Lab.* 736, and in *DC. Prodr.* xii. 380; floccose with white wool, stems many from the root ascending, leaves long-petioled orbicular cordate crenate, whorls distant in brachiate branches or terminating long peduncles woolly, bracts linear, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. villous, mouth oblique, teeth much shorter than the tube, upper triangular or lanceolate, lower much shorter, nutlets linear-oblong. N. rotundifolia, *Benth. in DC. l. c.* 392. Marmoritis rotundifolia, *Benth. Lab.* 490.

WESTERN TIBET, alt. 7–11,000 ft., *Jacquemont, Falconer,* &c.

Stems stout or slender, central sometimes 2–3 ft. and branched, obtusely 4-angled. *Leaves* 1–3 in. diam., margin sometimes sinuate; petiole stout, 4 in. and less. *Whorls* dense-fld., often coloured rose or purple; peduncle of lateral often 3 in. *Calyx-teeth* variable. *Corolla* $\frac{1}{3}$ in., tube slender, lips small. *Nutlets* $\frac{1}{12}$ in., quite

smooth.—*N. rotundifolia* (*Marmoritis*, Benth. Lab.) is founded on imperfect specimens of *N. floccosa.*

27. **N. graciliflora,** *Benth. in Wall. Pl. As. Rar.* i. 65, *Lab.* 476, and in *DC. Prodr.* xii. 382; annual, glabrate or pubescent, stems many from the root very slender branched, leaves long-petioled ovate or ovate-cordate acute coarsely serrate or crenate, whorls very few-fld. axillary and forming lax panicles with capillary branches and peduncles and long pedicelled flowers, bracts setaceous, calyx $\frac{1}{6}$ in. pubescent or glabrous, upper teeth triangular or lanceolate awned, lower shorter setaceous, nutlets granulate. *Wall. Cat.* 2123.

PANJAB PLAINS, from Hurdwar to the Indus, and SUBTROPICAL HIMALAYA N. of it, ascending to 4000 ft.

Nearly allied to *N. ruderalis*, but much more slender, with membranous coarsely crenate leaves, longer petioles and very lax few-fld. cymes, often on axillary long filiform peduncles, and nutlets more strongly tubercled. *Calyx-teeth* as long as the tube or shorter, variable in breadth. *Corolla* $\frac{1}{4}$ in., pale rose. *Nutlets* oblong, $\frac{1}{28}$ in. long.

** *Corolla more than $\frac{1}{2}$ inch long.*

28. **N. Govaniana,** *Benth. Lab.* 482, and in *DC. Prodr.* xii. 388; tall, erect, branched, finely pubescent, leaves large petioled ovate oblong or elliptic acute crenate, cymes few-fld. distant long-peduncled in axillary and terminal racemes, calyx $\frac{1}{3}$ in. pedicelled puberulous, teeth triangular much shorter than the tube, corolla 1 in. yellow, nutlets broadly oblong. Dracocephalum Govanianum, *Benth. in Wall. Pl. As. Rar.* ii. 65, and *Cat.* 2127.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 8–11,000 ft.

Stem 2–4 ft., 4-angled. *Leaves* 3–6 by $1\frac{1}{2}$–3 in., very variable, base acute rounded or cordate; petiole $\frac{1}{2}$–2 in. *Racemes* 3–6-fld.; bracts minute. *Calyx* straight, cylindric. *Corolla* yellow; tube long, very small, curved, greatly dilated above the middle. *Nutlets* $\frac{1}{18}$ in. long, broadly obovoid-oblong, quite smooth.

29. **N. erecta,** *Benth. Lab.* 482, and in *DC. Prodr.* xii. 388; tall, erect, branched, finely pubescent, leaves petioled ovate or oblong acute, whorls many-fld. distant axillary or in terminal spikes, the lower usually peduncled, calyx $\frac{1}{3}$ in. pubescent, teeth triangular much shorter than the tube, corolla $\frac{1}{2}$–1 in. blue, nutlets broadly oblong. Dracocephalum erectum, *Royle ex Benth. in Hook. Bot. Misc.* iii. 380. N. macrantha, *Led. Herb. Ind. Or. H.f. & T.*

Foliage of *N. Govaniana*, and calyx the same, but the inflorescence is contracted to spikes of interrupted sometimes many-fld. whorls with only a tendency to the lower being peduncled, and the flowers are blue.—It is very near the Siberian *N. macrantha*, but the nutlets are not linear.

30. **N. Clarkei,** *Hook. f.*; finely pubescent, erect, branched, leaves shortly petioled ovate-oblong or -lanceolate subacute toothed or crenate, whorls dense-fld. distant in strict terminal spikes and shortly peduncled in the lower axils, bracts lanceolate, lower leafy, calyx $\frac{1}{3}$ in. pubescent, teeth triangular acute much shorter than the tube, corolla $\frac{1}{2}$ in. blue, tube very slender, nutlets linear.

WESTERN HIMALAYA; Kashmir, at Tilail, alt. 11,000 ft., and Kunylwan, alt. 7500 ft., *Clarke*.

Stem strict, obtusely angled. *Leaves* 1–2 in., base acute or cordate; petiole

$\frac{1}{4}$–$\frac{1}{3}$ in. *Spikes* terminal, 3–6 in.; bracts of upper lanceolate, inner linear about equalling the calyx. *Calyx* nearly straight, mouth oblique; teeth subequal. *Nutlets* $\frac{1}{12}$ in., smooth. *Corolla-tube* three times as long as the calyx, mouth dilated; lips small, not $\frac{1}{4}$ in. across.—I have seen no lower leaves of this very distinct species.

31. **N. salviæfolia,** *Royle ex Benth. in Hook. Bot. Misc.* iii. 397, and in *DC. Prodr.* xii. 388; slender, erect, branched, densely white-tomentose all over, leaves small shortly petioled oblong or ovate obtuse crenate, whorls or cymes shortly peduncled distant in long strict narrow racemes or spikes, bracts minute subulate, calyx $\frac{1}{4}$ in. pedicelled scaberulous, teeth triangular subequal much shorter than the tube, corolla $\frac{3}{4}$ in. pale blue or white, tube very slender, nutlets oblong.

TEMPERATE WESTERN HIMALAYA; Kashmir, alt. 6–10,000 ft., *Jacquemont, Falconer*, &c. WESTERN TIBET, alt. 10–12,000 ft.; *Thomson.*

Stem 1–2 ft., nearly cylindric. *Leaves* thick, 1–1$\frac{1}{2}$ in., base acute rounded or cordate, wrinkled above, densely closely woolly beneath. *Racemes* a foot long and under; peduncles of cymes $\frac{1}{2}$–1 in. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in.; tube very slender, throat shortly dilated, limb $\frac{1}{4}$ in. across. *Nutlets* $\frac{1}{12}$ in. long, smooth.—The Tibetan specimens have more contracted racemes than the Kashmir, and the nutlets are rather narrower. Habit and white tomentum of *N. leucophylla* and *N. leucolæna*, but the calyx is very different.

E. Dwarf species. *Leaves* crowded. *Cymes* or whorls axillary, floral leaves as large as the cauline, and close set. (GLECHOMA, L.) See 14. *longibracteata* in A.

32. **N. nivalis,** *Benth. Lab.* 737, and in *DC. Prodr.* xii. 391; erect, pubescent, leaves sessile orbicular rugose green crenate, cymes all axillary few-fld. shorter than the leaves, calyx $\frac{1}{3}$ in. pubescent, teeth subequal lanceolate, stamens exserted, nutlets linear-oblong.

WESTERN TIBET; alt. 15–16,000 ft., *Jacquemont, Thomson.*

Rootstock creeping; stems 3–6 in. *Leaves* $\frac{1}{2}$–1 in. diam., close-set, base rounded or cordate. *Cymes* shortly peduncled, bracts minute. *Corolla* $\frac{1}{2}$–$\frac{2}{3}$ in., pale blue, resupinate, tube upcurved, throat slightly dilated, limb small. *Nutlets* $\frac{1}{12}$ in., *smooth.*

33. **N. tibetica,** *Benth. Lab.* 737, and in *DC. Prodr.* xii. 392; prostrate, softly tomentose, leaves petioled fan-shaped rugose crenate, cymes all axillary few-fld. shorter than the leaves, calyx $\frac{1}{2}$ in. woolly, teeth subequal lanceolate shorter than the tube, stamens included, nutlets linear-oblong.

WESTERN TIBET; Kookioghang, *Jacquemont*; Lunjar (N. of Kumaon), alt. 17,500 ft., *Strachey & Winterbottom.*

Rootstock long, slender, branching; stems 3–6 in. *Leaves* $\frac{1}{2}$–1 in. diam., close-set; base cuneate; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Cymes* subsessile, bracts filiform. *Corolla* $\frac{3}{4}$ in., white; tube straight, funnel-shaped; limb small, regular. *Nutlets* $\frac{1}{8}$ in., smooth.

DOUBTFUL SPECIES.

N. NEPALENSIS, *Spreng. Syst.* ii. 730, *Benth. in DC. Prodr.* xii. 395, from Nepal.—Of this nothing is known, and the description is insufficient to identify it.

30. **DRACOCEPHALUM,** *Linn.*

Erect or prostrate herbs. *Whorls* axillary or terminal, flowers blue, purple or white. *Calyx* tubular, 15-nerved, 5-toothed; teeth all subequal,

or upper much the largest, or 3 upper combined into a broad lip. *Corolla-tube* not annulate within, upper lip erect notched, lower spreading 3-fid, midlobe largest. *Stamens* 4, ascending under the upper lip, anther-cells diverging. *Style-lobes* subulate. *Nutlets* smooth.—Species about 30, S. European and Temperate Asiatic.

As characterized in modern works, *Dracocephalum* cannot be distinguished from *Nepeta*, to which latter genus the two last described species should probably be referred.

* *Calyx coriaceous, 2-lipped, upper lip of one very broad ovate entire acute tooth. Stamens included.*

1. **D. speciosum,** *Benth. in Wall. Pl. As. Rar.* ii. 65, *Lab.* 494, and in *DC. Prodr.* xii. 399; stem simple tall robust, radical leaves long-petioled orbicular-cordate crenate, cauline sessile, floral orbicular, whorls in a large solitary spike or axillary, calyx ½ in. coriaceous, upper tooth ovate, lower lanceolate. *Wall. Cat.* 2128; *Bot. Mag.* t. 6281.

ALPINE HIMALAYA; from Simla to Sikkim, alt. 12–15,000 ft.

Glabrous or woolly upwards. *Root* of very thick fleshy fibres; stem solitary, 6–18 in., 4-angled. *Leaves*, radical 2–4 in. diam., cauline smaller; petiole 5–12 in., slender. *Flowers* sessile in dense heads; bracts small, orbicular. *Calyx-teeth* apiculate, very variable in length and breadth. *Corolla* 1 in., blue-purple with dark spots, tubular, pubescent, lips short. *Stamens* subexserted. *Nutlets* ⅙ in., linear-oblong, top crenate.—Near *D. altaica.*

2. **D. nutans,** *Linn.*; stem ascending, leaves shortly petioled ovate or oblong obtuse crenate, spikes long interrupted, lower whorls axillary, calyx ¼ in. coriaceous puberulous, upper tooth broadly ovate, lower setaceous. *Benth. Lab.* 499, and in *DC. Prodr.* xii. 400; *Pall. Fl. Ross.* iii. t. 17; *Bot. Reg.* t. 841. Zornia nutans, *Moench Meth.* 411.—*Gmel. Fl. Sibir.* iii. 231, t. 49.

TEMPERATE WESTERN HIMALAYA; Kashmir, alt. 9–10,000 ft., *Falconer & Thomson, Clarke.*—DISTRIB. Central Asia, from Soongaria to Dahuria.

Scaberulous. *Stems* 6–12 in., simple or branched, 4-angled. *Leaves* ½–1 in.; petiole ⅙–½ in. *Spikes* 4–6 in.; whorls dense-fld., flowers horizontal or drooping, sessile; bracts ovate or oblong. *Calyx* often purple. *Corolla* ½ in., bright blue, tube slender. *Stamens* included. *Nutlets* $\frac{1}{12}$ in., linear-oblong.

** *Calyx coriaceous, 2-lipped; upper lip broad, 3-toothed. Stamens included.*

3. **D. moldavicum,** *Linn.*; annual, erect, branched, leaves sessile or petioled lanceolate obtusely deeply serrate or subpinnatifid, spikes long leafy, whorls distinct or distant, bracts lanceolate, teeth long-awned, calyx ⅓ in. glabrous, upper teeth broadly ovate mucronate. *Benth. in DC. Prodr.* xii. 401; *Lamk. Ill.* t. 513, f. 1; *Pall. Fl. Ross.* iii. t. 18; *Reichb. Ic. Fl. Germ.* t. 1240, f. 1.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 7–8000 ft., *Falconer, Edgeworth, Clarke.*—DISTRIB. Siberia, Dahuria.

Quite glabrous. *Stem* 1–2 ft., branched from the base. *Leaves* 1–2 in., narrowed into a short slender petiole. *Spikes* 4–8 in. *Flowers* pedicelled, shorter than the floral leaves. *Corolla* ¾–1 in., blue, tube greatly dilated to the throat. *Stamens* subexserted. *Nutlets* $\frac{1}{10}$ in., narrowly oblong truncate.

4. **D. heterophyllum,** *Benth. Lab.* 738, and in *DC. Prodr.* xii. 401; stems ascending, leaves petioled oblong ovate or cordate obtuse crenate,

spikes large dense-fld. leafy, floral leaves and bracts pectinate, teeth awned, calyx $\frac{1}{3}$–1 in. glabrous or pubescent, upper teeth broadly ovate aristate.—D. acanthoides, *Edgew. ex Benth. in DC. l. c.*

WESTERN TIBET, alt. 13–16,000 ft.; *Jacquemont, Falconer,* &c.—DISTRIB. Turkestan.

Glabrous or scaberulous, brittle. *Stems* 6–8 in., stout, ascending, obtusely angled, simple or divided. *Leaves* 1–1$\frac{1}{2}$ in., coriaceous; petiole $\frac{1}{4}$–1 in. *Spikes* often larger than the rest of the plant, cylindric, 1–1$\frac{1}{2}$ in. diam.; bracts green, elliptic, membranous. *Calyx* most variable in size, thinly coriaceous. *Corolla* $\frac{3}{4}$–1$\frac{1}{4}$ in., white, hoary, inflated beyond the calyx, lower lip short. *Stamens* included. *Nutlets* $\frac{1}{8}$–$\frac{1}{5}$ in., narrow oblong, tip truncate or crenulate.—*D. acanthoides* is a rather larger leaved and flowered state from Tibet N. of Kumaon, alt 12–15,500 ft. (*Edgeworth, Strachey & Winterbottom*).

5. **D. Ruprechtii,** *Regel Descr. Plant. Nov. fasc.* vii. 77; stems ascending scaberulous, leaves sessile pinnatifid, lobes linear, whorls few-fld. distant, bracts pinnatifid with awned lobes, calyx $\frac{1}{2}$–$\frac{3}{4}$ in. glabrous, upper teeth broadly ovate mucronate. D. bipinnatum, *Rupr. Sert. Thianschen.* 65 (*ex Regel*).

WESTERN TIBET; Gilgit, *Col. Tanner.*—DISTRIB. Turkestan.

Nearly allied to *D. moldavicum,* but leaves pinnate with narrow lobes, corolla much larger, 1–1$\frac{1}{4}$ in. long, more tubular, not so abruptly inflated, nutlets larger. *Calyx* often purple. *Corolla* pubescent, blue.

*** *Calyx nearly equally 5-cleft. Stamens exserted.*

6. **D. stamineum,** *Karel. & Kiril.*; low, diffusely branched from the base, stems terete few-leaved, leaves small petioled orbicular-cordate or reniform deeply crenate, whorls tomentose dense-fld. in terminal heads and one or more lower on the stem, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. tomentose, teeth ovate-lanceolate aristate.

WESTERN HIMALAYA; Kashmir, on Barjila, alt. 11,000 ft., *Clarke.* WESTERN TIBET, alt. 14–16,000 ft., *Thomson, Clarke.*—DISTRIB. Turkestan, Alatau Mts.

Stems excessively numerous from the root, ascending, green or purple. *Leaves* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., rugose, glabrous or tomentose; petiole of lower 1–3 in., very slender. *Heads* $\frac{3}{4}$ in. diam.; bracts small, cuneate, entire or toothed. *Calyx* sessile, often coloured. *Corolla* small, dark blue, tube shortly exserted, limb small. *Filaments* sometimes twice the length of the tube. *Nutlets* $\frac{1}{12}$ in. long, oblong, smooth.—Rather a *Nepeta* than a *Dracocephalum.*

6205 7. **D. Hookeri,** *Clarke mss.*; scaberulous, leaves pinnatifid, segments narrow linear, margins recurved, whorls in a dense terminal spike interrupted at the base, bracts pinnatifid, calyx $\frac{1}{2}$–$\frac{2}{3}$ in. scaberulous, teeth equal nearly as long as the tube lanceolate pungent, sinus thickened.

EASTERN TIBET; north of Sikkim, alt 15,000 ft.? *J. D. H.*

Specimens incomplete procured by collectors; upper portions of stem and spikes alone seen. *Stem* 4-angled. *Leaves* 1 in., sessile; segments few, spreading. *Spikes* 2–3 in. long by 1 broad. *Flowers* sessile. *Calyx* straight or curved. *Corolla* twice as long, tube narrow, throat moderately inflated. *Stamens* shortly exserted. *Nutlets* $\frac{1}{16}$ in., oblong, smooth.

31. LALLEMANTIA, *Fisch. & Mey.*

Characters of *Dracocephalum,* but upper lip of calyx with 3 obtuse lobes, of which the lateral are placed under the central.—DISTRIB. Species 4, Oriental and N.W. Indian.

This genus would better be included in *Dracocephalum.*

L. Royleana, *Benth. in DC. Prodr.* xii. 404; hoary-pubescent or glabrate, leaves shortly petioled ovate or oblong obtuse coarsely crenate, bracts oblong or lanceolate, teeth long-awned, calyx-teeth erect with incurved margins. *Boiss. Fl. Orient.* iv. 674. Dracocephalum Royleanum, *Benth. in Wall. Pl. As. Rar.* i. 65, and *Lab.* 497; *Wall. Cat.* 2129. D. inderiense, *Karel. & Kiril. in Bull. Soc. Imp. Mosc.* xv. 424. Nepeta erodiifolia, *Boiss. Diagn.* v. 24.

PANJAB PLAINS and HILLS; from Lahore westward indigenous? and cultivated. —DISTRIB. Affghanistan, Persia, Turkestan.

Annual, erect, 6–18 in.; stem branched or simple, obtusely angled. *Leaves* ½–1 in., base cordate or narrowed into the petiole. *Whorls* very numerous, in long interrupted narrow spikes; flowers shortly pedicelled; bracts small, deciduous. *Calyx* ⅓ in., erect, rigid. *Corolla* pale lilac, tube hardly exserted, limb small. *Stamens* included. *Nutlets* $\frac{1}{16}$ in., narrowly oblong, smooth.

32. SCUTELLARIA, *Linn.*

Herbs or undershrubs. *Inflorescence* various. *Calyx* 2-lipped, lips closed in fruit, upper deciduous; tube with a large deciduous shield or pouch opposite the upper lip. *Corolla-tube* long, usually sharply recurved from the base and erect, not annulate within; upper lip entire or notched, lower broad, 3-lobed. *Stamens* 4; anthers conniving, ciliate, lower 1- upper 2-celled. *Disk* elongate. *Ovary* oblique, upper style-lobe short. *Nutlets* very minute, smooth, granulate or hispidulous.—Species about 90, N. Temp. and Tropical, many Andean.

* *Flowers in short leafy terminal spikes that are 4-angled in bud, bracts leafy.*

1. **S. prostrata,** *Jacquem. mss.*; *Benth. Lab.* 733, and in *DC. Prodr.* xii. 413; dwarf, prostrate, much branched, tomentose, leaves small petioled ovate coarsely toothed, spikes short 4-gonous, bracts ovate, corolla 1 in.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–14,000 ft., *Jacquemont*, &c.

Rootstock stout; stems many, 4–8 in., flexuous, subterete. *Leaves* ½–1 in., base cordate or cuneate. *Spikes* 1–2 in. *Corolla* yellow tipped with violet. *Nutlets* hispidulous.

2. **S. Heydei,** *Hook. f.*; dwarf, prostrate, much branched, branches and calyx hirsute with long spreading hairs, leaves very small shortly petioled ovate or cordate obtuse crenate, spikes short 4-gonous, bracts ovate, corolla ¾ in. S. glutinosæ, *Benth. var.?, Aitchison in Journ. Linn. Soc. Bot.* xix. 183.

WESTERN ALPINE HIMALAYA; Zanskar, alt. 15–16,000 ft., *Thomson, Heyde.*—DISTRIB. Affghanistan.

Habit of *S. prostrata*, but leaves more woolly, smaller, shorter-petioled, and with long spreading white hairs on the branches and calyx. *Corolla* yellow, tipped with blue or rose.—Near *S. pulchella*, Bunge, of the Altai.

** *Flowers in long narrow racemes, bracts shorter than the pedicel and calyx.*

3. **S. discolor,** *Coleb. in Wall. Pl. As. Rar.* i. 66; pubescent or tomentose, leaves long-petioled elliptic obtuse crenate, base rounded or cordate, floral minute, racemes very long slender, flowers scattered rarely

opposite secund, corolla ½–⅔ in., nutlets scabrid. *Benth. in DC. Prodr.* xii. 417; *Dalz. & Gibs. Bomb. Fl.* 210. S. indica, *Blume Bijd.* 839; *Wall. Cat.* 2134; *Don Prodr.* 109; *Grah. Cat. Bomb. Pl.* 152. S. heteropoda, *Miq. Fl. Ind. Bat.* ii. 972.

SUBTROPICAL HIMALAYA; from Kumaon to Assam, alt. 1–6000 ft. KHASIA MTS., alt. 4–6000 ft. TENASSERIM, *Parish*. MALABAR GHATS; Concan and Canara, *Ritchie*, &c.—DISTRIB. Burma, Java.

Stem ascending from a creeping rootstock, 1–2 ft., rarely branched, often naked above. *Leaves* 2–5 by ¾–3 in., rarely orbicular; petiole 1–3 in. *Racemes* 6–10 in.; pedicels ⅛ in.; bracts linear or oblong, all or all but the lowest shorter than the pedicel.

4. **S. violacea,** *Heyne mss.*; *Benth. in Wall. Pl. As. Rar.* i. 66, *Lab.* 429, and in *DC. Prodr.* xii. 418; pubescent tomentose or glabrate, leaves long-petioled ovate-cordate subacute coarsely crenate or sinuate-toothed, flowers opposite secund. *Wall. Cat.* 2136; *Wight Ic.* t. 1449, and *Ill.* 176 *bis*, f. 7. *Thwaites Enum.* 239. S. indica, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 24.

DECCAN PENINSULA; Mts. from the Nilghiris, alt. 5–7000 ft., southwards. CEYLON, ascending to 7000 ft.

Habit of *S. discolor*, but at once distinguished by the opposite flowers. *Corolla* 1 in. long, "white or tinged with rose," *Wight*. *Nutlets* hispid. The following forms do not seem to me to constitute definitely marked varieties.

VAR. *Colebrookiana*; leaves more deltoid thicker softly tomentose on both surfaces, calyx larger. S. Colebrookiana, *Benth. in Wall. Pl. As. Rar.* i. 67, and in *DC. l. c.*; *Wall. Cat.* 2135.

VAR. *hispidior*, *Benth. in DC. l. c.*; stouter, more rigid, leaves thick, bracts sometimes equalling the pedicels. S. robusta, *Benth. in DC. l. c.* S. Wightiana, *Benth. in Wall. Pl. As. Rar.* i. 67; *Wall. Cat.* 2708. S. nodulosa, *A. Ham. Monogr. Scutell.* 26.—Ceylon and Nilghiris.

VAR. *floribunda*; branched, inflorescence compound, flowers rather smaller. S. floribunda, *Benth. in DC. l. c.*—Ceylon.

5737 VAR. *sikkimensis*; often tall, rambling and much branched.—Sikkim, *J. D. H.*

5. **S. oblonga,** *Benth. in Bot. Reg.* x. t. 1493 *in note*, *Lab.* 429, and in *DC. Prodr.* xii. 418; pubescent or glabrate, erect or decumbent, leaves petioled oblong- or linear-lanceolate obtuse or acute or acuminate serrate or sinuate-toothed, flowers opposite, corolla ½ in. *Thwaites Enum.* 240.

CEYLON; Central Province, ascending to 7000 ft.

Stem often woody below, 6–24 in., simple or branched, leafy. *Leaves* 1–2½ by ⅛–1 in., base acute, rarely rounded, never cordate, pale beneath. *Racemes* rarely 6 in.; pedicels ⅛ in., longer than the bracts. *Corolla* blue. *Nutlets* minutely granulate.

6? **S. incurva,** *Wall. Pl. As. Rar.* i. 67; "stem ascending branched pubescent, leaves subsessile elliptic-oblong acute remotely serrate almost glabrous, floral minute, flowers opposite secund, pedicels thrice as long as the calyx, corolla-tube slender incurved, lips deeply split, upper broad hooded, lower shorter." *Benth. in DC. Prodr.* xii. 418; *Wall. Cat.* 2138.

BURMA; at Taongdong, *Wallich*.

The above is Bentham's description of the solitary imperfect specimen in the Wallichian Herbarium. The habitat is beyond the British boundary.

*** *Flowers in long narrow racemes, bracts longer than the pedicel and calyx but hardly leafy.*

7. **S. glandulosa,** *Hook. f.*; dwarf, erect, glandular-hairy, leaves small sessile oblong-lanceolate obtuse subserrate, flowers opposite, pedicels very short, corolla ⅓ in.

BURMA; valley of Mogoung, dry plains towards the Serpentine mines, *Griffith.*

A span high; rootstock woody; stem simple or sparingly branched. *Leaves* few, ⅓–1 in., sparsely hairy on both surfaces. *Racemes* strict, very glandular; bracts elliptic, longer than the pedicels.—A curious little species from beyond the British boundary.

8. **S. grossa,** *Wall. Pl. As. Rar.* i. 67; *Cat.* 2142; pubescent, stem procumbent below much branched, leaves petioled ovate acute coarsely crenate-serrate, base truncate rarely cuneate, bracts elliptic exceeding the calyx, corolla ¾ in. *Benth. in DC. Prodr.* xii. 419. S. mussooriensis, *Wawra in Œstr. Bot. Zeit.* 1881, 69, and *It. Pr. Sax. Cob. Bot.* 106.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–8000 ft., *Wallich*, &c.

Black when dry. *Stems* slender, 1–2 ft., creeping below. *Leaves* 1–2½ in., nearly glabrous; petiole ¼–1 in., slender. *Raceme* slender, 3–6 in.; pedicels very short; bracts ¼–⅓ in. *Corolla* pubescent, blue-purple. *Nutlets* puberulous.

9. **S. khasiana,** *Clarke mss.*; glabrescent, slender, leaves long-petioled ovate acute crenate, base acute, bracts small longer than the pedicels, corolla ½ in. throat inflated.

KHASIA MTS., alt. 4–5000 ft.; Nunklow, *Griffith*; Kala pani, *Clarke.*

Stem 2–3 ft., branched, rambling, terete, glabrous. *Leaves* 1½–2 in., glabrous, membranous; petiole ½–1 in. *Racemes* 3–4 in., lax-fld., pubescent; bracts ⅛–¼ in., elliptic or ovate, lower crenate. *Corolla* pale blue? *Nutlets* granulate.

10. **S. angulosa,** *Benth. in Wall. Pl. As. Rar.* i. 67, *Lab.* 444, and in *DC. Prodr.* xii. 430; tall, sparsely hairy, branches diffuse acutely 4-angled, leaves short-petioled ovate or lanceolate obtuse or acute crenate or serrate, base rounded or subcordate, racemes tomentose, lower bracts leafy, corolla 1 in. *Wall. Cat.* 2139. S. scandens, *Don Prodr.* 110; *Benth. Lab.* 444. S. celtidifolia, *A. Ham. Monogr. Scutell.* 27.

TEMPERATE WESTERN and CENTRAL HIMALAYA; from Kashmir to Nepal, alt. 4–9000 ft., *Wallich*, &c.

Stem very stout below; branches rambling for several feet (not scandent); angles with slender ribs. *Leaves* 1–3 in., with a few small scattered hairs, often purple beneath; petiole ⅙–½ in. *Racemes* 3–4 in.; bracts all leafy, upper small entire. *Corolla* white. *Nutlets* granulate.

11. **S. repens,** *Ham. in Don Prodr.* 110; pubescent or tomentose, diffuse, branches long ascending, leaves petioled ovate acute entire or crenate-serrate, base acute or truncate, racemes long glandular-hairy, bracts ¼–⅓ in. ovate, corolla ½ in. *Benth. Lab.* 443, and in *DC. Prodr.* xii. 429. S. cana, *Wall. Pl. As. Rar.* i. 67, and *Cat.* 2141. S. Wallichiana, *A. Ham. Monogr. Scutell.* 28, t. 2, f. 1.

SUBTROPICAL HIMALAYA; from Kashmir to Sikkim, alt. 1–5000 ft.—DISTRIB. Ava.

Stems long, stout, curved, brittle, obtusely 4-angled; branches crowded, curved, ascending. *Leaves* ½–1½ in., upper quite entire; base rarely subcordate; petiole ¼–1 in. *Racemes* 6–10 in., stout or slender, curved; bracts ovate, ⅙–¼ in., entire or crenate; pedicels very short. *Corolla* sharply recurved, pale purple ("yellow," Don). *Nutlets* subgranulate.

12. **S. linearis,** *Benth. in Wall. Pl. As. Rar.* i. 66, *Lab.* 435, and in

DC. Prodr. xii. 423; dwarf, puberulous, stems prostrate and ascending, leaves subsessile linear obtuse, margins recurved quite entire, racemes very short glandular-pubescent, bracts ovate entire, corolla ¾–1 in., throat much inflated. *Wall. Cat.* 2137.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 3–8000 ft.—DISTRIB. Affghanistan.

Rootstock stout, woody; stems very numerous, 4–8 in., terete. *Leaves* ⅓–1½ in., rarely oblong-lanceolate. *Racemes* ½–1 in.; pedicels very short; bracts ¼–⅓ in., *Corolla* purple, tube nearly straight. *Nutlets* puberulous.

**** *Flowers all axillary.*

13. **S. rivularis,** *Wall. Pl. As. Rar.* i. 66, and *Cat.* 2140; dwarf, glabrous, stems subsimple leafy, leaves lower shortly petioled, upper sessile ovate or lanceolate obtuse entire or crenate, base acute dilated or cordate, flowers axillary subsessile or spicate, corolla ¼–½ in. nearly straight. *Benth. Lab.* 437, and in *DC. Prodr.* xii. 426; *Wight Ic.* t. 1450. S. peregrina, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 24. S. barbata, *Don Prodr.* 109. S. squamulosa, *A. Ham. Monogr. Scutell.* 35. S. minor, β indica, *Benth. in DC. l. c.* 427.

CENTRAL HIMALAYA; Nepal, *Wallich.* KHASIA MTS., alt. 4–5000 ft.; *Griffith,* &c. TENASSERIM: at Moulmein, *Parish.* NILGHIRI and ANAMALLAY MTS.; *Wight,* &c.—DISTRIB. China.

Stem creeping below, ascending 6–8 in. and leafy, or drawn out to 12–15 in., subterete. *Leaves* very variable, ½–1 in., close set, passing into the floral or bracts. *Spikes* 3–6 in., bracts quite entire ovate or lanceolate. *Calyx* and *corolla* (blue) glabrous or pubescent. *Nutlets* granular.—Very near *S. minor,* L.

14. **S. galericulata,** *Linn.*; puberulous, erect, leaves shortly petioled ovate-lanceolate obtuse or subacute, base cordate crenate or upper entire, flowers axillary, bracts all leafy much exceeding the calyx, pedicels very short, corolla ⅔ in. *Benth. in DC. Prodr.* xii. 425; *Boiss. Fl. Orient.* iv. 690 *Reichb. Ic. Fl. Germ.* t. 1256, f. 2.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5–8000 ft.—DISTRIB. Europe, from the Caucasus westward, N. Africa, Central and N. Asia, N. America.

Stem below creeping, then erect, 2–3 ft. *Leaves* 1½–2½ in., crenatures rather remote, upper often entire.

33. BRUNELLA, *Linn.* (PRUNELLA, *Linn.*)

Perennial herbs. *Whorls* in dense heads; bracts orbicular; flowers purplish, rarely white. *Calyx* reticulate, 2-lipped, closed in fruit, upper lip flat, 3-toothed, lower 2-lobed; throat naked. *Corolla* ascending, tube annulate at the base within; upper lip erect, concave; lower spreading, side lobes deflexed, midlobe concave. *Stamens* 4, exserted, filaments 2-fid, lower arm antheriferous; anthers conniving, cells diverging. *Disk* erect, symmetrical. *Style-lobes* subulate. *Nutlets* oblong, smooth.—Species 3, N. and S. temp. regions.

B. vulgaris, *Linn.*; leaves petioled ovate or oblong entire toothed or pinnatifid. *Don Prodr.* 109; *Benth. in Wall. Pl. As. Rar.* i. 66, and in *DC. Prodr.* xii. 410; *Wall. Cat.* 2132; *Wight Ic.* t. 1448; *Boiss. Fl. Orient.* iv. 691.

TEMPERATE HIMALAYA and WESTERN TIBET; from Kashmir to Bhotan; alt.

4–11,000 ft. KHASIA MTS., alt. 4–6000. NILGHIRI and TRAVANCORE MTS., alt. 6–8000 ft.—DISTRIB. N. Temp. Zone, Andes, Australia.

Rootstock creeping. *Stem* 4–12 in., erect or ascending. *Leaves* 1–2 in., upper sessile. *Spikes* 1–3 in., cylindric; bracts ovate-cordate, ciliate, edges often purple. *Flowers* dimorphic, larger 2-sexual, smaller female. *Calyx-teeth* very variable, awned or not. *Corolla* $\frac{1}{3}$–$\frac{3}{4}$ in., purple or white.

VAR. *vulgaris*; glabrous or sparingly hairy.—Himalaya Mts.

VAR. *hispida, Benth. in DC. l. c.*; hispidly hairy. B. hispida, *Benth. in Wall. Pl. As. Rar.* i. 66. B. ovata, *Wall. Cat.* 2133.—Sikkim, Khasia and Nilghiri Mts.

34. **MARRUBIUM,** *Linn.*

Perennial tomentose or woolly herbs. *Whorls* axillary, flowers small. *Calyx* tubular, 5–10-nerved; teeth 5–10, equal, short, subspinescent. *Corolla* short, tube naked or annulate within, upper lip erect, lower spreading, midlobe largest. *Stamens* 4, included; anthers glandular, cells diverging. *Style-lobes* short, obtuse. *Nutlets* obtuse.—Species 30, temperate and warm regions of the Old World.

1. **M. vulgare,** *Linn.*; tall, robust, shortly woolly, leaves petioled ovate or orbicular crenate rugose, whorls axillary many and dense-fld., calyx-teeth 10 subulate spreading and recurved, throat woolly. *Benth. in DC. Prodr.* xii. 153; *Boiss. Fl. Orient.* iv. 703; *Reichb. Ic. Fl. Germ.* t. 1224, f. 1. M. propinquum, *Benth. in DC. l. c.* (the Kashmir plant).

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5–8000 ft., *Falconer.*—DISTRIB. Westward through Europe and N. Africa.

Stem 2–4 ft., leafy. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. diam., base rounded or cordate or cuneate, leathery, wrinkled; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Whorls* depressed, villous. *Calyx* $\frac{1}{6}$–$\frac{1}{4}$ in., coriaceous; teeth often hooked at the tip. *Corolla* $\frac{1}{2}$ in., white, tube slender, upper lip long, 2-fid. *Nutlets* $\frac{1}{12}$ in., smooth.

2. **M. lanatum,** *Benth. Lab.* 587, and in *DC. Prodr.* xii. 448; dwarf, clothed with long soft white wool, leaves petioled rounded lobed and crenate or $\frac{1}{2}$-pinnatifid, whorls in a dense terminal cylindric or oblong thickly woolly spike, calyx-teeth 5 acicular spreading and recurved, throat naked. Mollucella Marrubiastrum, *Steph. in Mem. Soc. Nat. Mosc.* ii. 8; *Ledeb. Ic. Pl. Fl. Ross. Alt.* t. 150. Lagopsis incana, *Bunge Monog. Molucc. ined.*

WESTERN TIBET, alt. 15–16,000 ft.; *Thomson, Henderson.* NORTHERN GURWHAL; at Shelshil, alt. 16,000 ft., *Strachey & Winterbottom.* DISTRIB. Turkestan and Altai Mts.

Stems many, ascending from the stout rootstock, stout, 3–6 in. *Leaves* very thick, $\frac{1}{2}$–1 in. diam.; petiole stout, as long or shorter. *Spikes* 1–2 in., 1 in. diam.; flowers immersed in wool; bracts linear or setaceous. *Calyx-tube* $\frac{1}{8}$ in., membranous, teeth as long, pungent. *Corolla* very small, upper lip short, entire. *Nutlets* $\frac{1}{12}$ in. long, hoary.

35. **CRANIOTOME,** *Reichb.*

A perennial erect branched herb. *Leaves* long-petioled. *Flowers* minute, in slender lax-fld. panicled racemes. *Calyx* ovoid, fruiting globose, equally 5-toothed; throat constricted, villous within. *Corolla,* upper lip minute, concave, entire; lower longer, spreading, 3-fid. *Stamens* ascending under the upper lip; anther-cells didymous, at length diverging. *Style* subequally 2-fid. *Nutlets* very minute, subglobose, smooth.

C. versicolor, *Reichb. Iconogr.* i. 39, t. 54; *Benth. in Wall. Pl. As.*

Rar. i. 64, *Lab.* 704, and in *DC. Prodr.* xii. 455; *Wall. Cat.* 2081. Nepeta versicolor, *Trevir. in Nov. Act. Nat. Cur.* xii. 183. Anisomeles nepalensis, *Spreng. Syst.* ii. 706. Ajuga furcata, *Link Enum.* ii. 99.

TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 5–7000 ft., *Wallich*, &c. KHASIA MTS., alt. 4–6000 ft.

Usually densely patently softly hirsute all over. *Stem* erect, 1–2 ft., terete, stout or slender. *Leaves* 2–4 by 1–3 in., broadly ovate-cordate, acuminate, toothed or crenate; petiole slender, 1–2 in. *Cymes* copious and very compound; bracts subulate. *Calyx* $\frac{1}{10}$ in., teeth triangular. *Corolla* about twice as long, pale purple or rose-coloured. *Nutlets* $\frac{1}{36}$ in., pale, shining.—In Sikkim a state occurs with the fruiting calyx campanulate and $\frac{1}{4}$ in. long, without nutlets.

36. ANISOMELES, *Br.*

Tall, erect, branching, coarse herbs. *Flowers* in axillary whorls or lax-fld. branched panicled cymes, purplish. *Calyx* ovoid or tubular, straight, equally 5-toothed. *Corolla-tube* short, annulate within; upper lip erect, entire; lower broad, spreading, midlobe notched. *Stamens* exserted; anthers conniving, of the longer pair dimidiate, of the shorter 2-celled, cells transverse parallel. *Style* subequally 2-fid. *Nutlets* smooth.—Species about 8, warmer Asia and Australia.

1. **A. Heyneana,** *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 702, and in *DC. Prodr.* xii. 455; sparsely hairy or glabrate, leaves ovate-lanceolate acuminate crenate-serrate, cymes peduncled lax-fld., calyx $\frac{1}{6}$–$\frac{1}{4}$ in. hispid, teeth triangular-lanceolate acuminate, margins fringed. *Dalz. & Gibs. Bomb. Fl.* 210. Teucrium secundum, *Heyne in Wall. Cat.* 2028.

DECCAN PENINSULA; Western Ghats, from the Concan southwards.

Stem 3–4 ft., acutely angled. *Leaves* 2–3 in., green; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Cymes* sometimes elongate and many-flowered; bracts small, subulate. *Calyx-teeth* strongly reticulate, hairy within, margin fringed. *Corolla* $\frac{1}{2}$ in., white. *Nutlets* $\frac{1}{16}$ in., broadly oblong, polished.—Perhaps only a variety of *A. ovata.*

2. **A. ovata,** *Br. in Ait. Hort. Kew,* ed. 2, ii. 364; tomentose or densely woolly rarely sparsely hairy, leaves ovate acuminate crenate-serrate, whorls axillary dense-fld. and in dense terminal spikes, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. hirsute, teeth triangular-lanceolate acuminate. *Wall. Cat.* 2040; *Jacq. Eclog.* i. t. 86; *Hook. Bot. Misc.* ii. 358, *Suppl.* t. 19; *Benth. in Wall. Pl. As. Rar.* i. 59, and in *DC. Prodr.* xii. 455; *Grah. Cat. Bomb. Pl.* 153; *Wight Ic.* t. 865. A. disticha, *Heyne in Roth Nov. Sp.* 254; *Roxb. Fl. Ind.* iii. 2; *Dalz. & Gibs. Bomb. Fl.* 210. A. glabrata, *Benth. in Wall. Cat.* 2041. A. mollissima, *Wall. Cat.* 2039. Nepeta indica, *Linn. Sp. Pl.* 799. N. amboinica, *Linn. fil. Suppl.* 273. N. disticha, *Blume Bijd.* 823. Ballota disticha, *Linn. Mant.* 83. B. mauritiana, *Pers. Syn.* ii. 126. Ajuga disticha, *Roxb. Fl. Ind.* iii. 2. Marrubium indicum, *Burm. Fl. Ind.* 227. M. odoratissimum, *Burm. Thes. Zeyl.* t. 71, f. 1. Monarda zeylanica, *Burm. Fl. Ind.* 12. Phlomis alba, *Blanco Fl. Filip.* ed. i. 474.—*Rheede Hort. Mal.* x. t. 88.

TROPICAL and SUBTROPICAL INDIA, from the INDUS to ASSAM, ascending the Himalaya to 5000 ft., and south to SINGAPORE, TRAVANCORE and CEYLON.—DISTRIB. Malay Archipelago, China, Philippines.

Annual, 3–6 ft., most variable in hairiness. *Leaves* 1–3 in., thick, 6 in. green and membranous in Sikkim specimens, white or green; petiole $\frac{1}{3}$–$1\frac{1}{2}$ in. *Whorls* many- and dense-fld.; bracts variable. *Corolla* purplish. *Nutlets* as in *A. Heyneana.*—Order of Camphor.

3. **A. candicans,** *Benth. in Wall. Pl. As. Rar.* i. 59, and in *DC. Prodr.* xii. 456; softly tomentose or velvety, leaves shortly petioled lanceolate or oblong acuminate serrate, whorls axillary dense-fld. and in dense terminal spikes, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. hirsute, teeth triangular-lanceolate acuminate. *Wall. Cat.* 2038. M. malabarica, β nigrescens, *Benth. in DC. l. c.* 457; *Wall. Cat.* 2037.

BURMA; at Prome and Yenanghuen, *Wallich.*

A very doubtful species, of which there are two forms in Wallich's Herbarium under the name, one with oblong obtuse petioled leaves, the other with subsessile lanceolate ones, the latter agreeing with Bentham's *A. malabarica*, var. *nigrescens*. Of this last the calyx is that of *ovata*, the leaves of *malabarica*.

4. **A. malabarica,** *Br. in Bot Mag.* t. 2071; densely tomentose or thickly woolly, leaves short-petioled oblong linear-oblong or oblong-lanceolate obtuse acute or acuminate crenate or serrate, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. villous or woolly, teeth narrow lanceolate. *Wall. Cat.* 2037; *Hook. Journ. Bot.* i. 225, t. 127; *Wight Ic.* t. 164; *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 702, and in *DC. Prodr.* xii. 456; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 210. A. intermedia, *Wight in Benth. Lab.* 703, and in *DC. l. c.* Nepeta malabarica, *Linn. Mant.* 566. Ajuga fruticosa, *Roxb. Fl. Ind.* iii. 1.

DECCAN PENINSULA, abundant; Penang, *Wallich.* CEYLON, in hot dry places.—DISTRIB. Mauritius.

Shrubby, 4–6 ft.; branches sometimes very stout and most densely clothed with snow-white appressed wool. *Leaves* 2–6 in., very thick, base cuneate, very rarely cordate; petiole $\frac{1}{6}$–$\frac{1}{2}$ in., very stout. *Spikes* sometimes very heavy with dense whorls 2 in. diam., densely woolly; bracts filiform, teeth very slender. *Corolla* purple. *Nutlets* pale.

37. ACHYROSPERMUM, *Blume.*

Softly pubescent undershrubs or herbs; branches terete. *Whorls* in dense spikes. *Calyx* 10-nerved, lips short, upper erect, 3-fid; lower shorter, spreading, 2-fid. *Corolla-tube* slender, not annulate within; upper lip short, erect, notched; lower 3-lobed, midlobe largest concave. *Stamens* 4, subequal, ascending; anthers 2- or by confluence 1-celled. *Style* 2-fid. *Nutlets* crowned with a rugged annulus or chaffy beard.—Species 5 or 6, of India, the Malaya Islands, Tropical Africa and Madagascar.

6544 **A. Wallichianum,** *Benth. mss.*; hoary or tomentose or villous, leaves elliptic-ovate acuminate crenate-toothed, blade decurrent on the long petiole, bracts exceeding the calyx orbicular acuminate, nutlets crowned with a jagged annulus. Teucrium Wallichianum, *Benth. in Wall. Pl. As. Rar.* ii. 19, *Lab.* 671, and in *DC. l. c.* 580; *Wall. Cat.* 2758.

EASTERN SUBTROPICAL HIMALAYA; from Sikkim, alt. 3–6000 ft., *J. D. H.*, to Mishmi, *Griffith.* KHASIA HILLS, alt. 2–5000 ft.; *Bruce, Griffith.* TENASSERIM, *Helfer.*

Suffrutescent; stem terete, 1–3 ft., simple or branched, rigid. *Leaves* 4–6 by 2–4 in., membranous, sparsely pubescent. *Spikes* 2–6 in., cylindric, glabrate or villous; bracts membranous, ciliate. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., rather inflated, membranous; teeth triangular, reticulate. *Corolla* $\frac{1}{2}$ in., white dotted with rose. *Nutlets* $\frac{1}{8}$ in., turgid, faintly hairy.—There are two varieties, one tomentose with villous spikes from Silhet (Wallich) and Tenasserim; the other more glabrous from the Khasia and Himalaya. I suspect both may prove forms of the Javan *A. densiflorum*, Bl., from which *A. philippinense*, Benth., does not differ.

38. **COLQUHOUNIA,** *Wall.*

Tall, robust, rambling shrubs; branches terete. *Whorls* axillary and in lax-fld. spikes or racemes of orange or scarlet flowers. *Calyx* obscurely 10-nerved, subequally 5-toothed, throat naked. *Corolla-tube* incurved, not annulate, throat inflated; upper lip short, entire or notched, lower subequally 3-lobed. *Stamens* 4, ascending; anthers conniving in pairs; cells divaricate, confluent. *Style* subequally 2-fid. *Nutlets* winged above.—Species 3 or 4, Indian.

I am quite unable to distinguish the first three species, or to reconcile their specimens, descriptions and published drawings with one another.

1. **C. coccinea,** *Wall. in Trans. Linn. Soc.* xiii. 608; *Tent. Fl. Nap.* i. 13, t. 6, and *Cat.* 2085; branches tomentose, leaves elliptic ovate or cordate glabrate or subtomentose, calyx $\frac{1}{3}$–$\frac{1}{2}$ in. hoary. *Benth. in DC. Prodr.* xii. 457; *Bot. Mag.* t. 4514. C. tomentosa, *Houllet in Rev. Hortic.* 1873, 131, with fig.

TEMPERATE HIMALAYA; from Kumaon, *Wallich,* to Sikkim, alt. 7–9000 ft., *J. D. H.*

A shrub, 8–10 ft. *Leaves* 2–5 in., very variable in form and clothing. *Flowers* in an original drawing named by Wallich, and in the Tentamen figure, chiefly axillary, with a short subhemispheric calyx $\frac{1}{3}$ in. long (Bentham's var. β *parviflora*), and dull red corolla with the broad cylindric tube not twice the length of the calyx; in Wallich's and other specimens the flowers are very different, both axillary and in terminal spikes, the calyx and corolla are both twice as long, and the latter has a narrow tube. The plant figured in the Botanical Magazine, which was raised from seed sent by Wallich, has flowers all axillary, small calyces, a corolla $\frac{3}{4}$ in. long, funnel-shaped above the calyx, with much narrower orange-red lobes, the latter golden yellow at the base and in the throat.—*Nutlets* $\frac{1}{6}$ in. long, wing obliquely truncate.

2. **C. vestita,** *Wall. Tent. Fl. Nap.* i. 14; *Plant. As. Rar.* iii. 43, t. 267, and *Cat.* 2086; densely clothed with thick white wool, leaves elliptic ovate or cordate, calyx $\frac{1}{3}$–$\frac{1}{2}$ in. woolly. *Benth. in DC. Prodr.* xii. 457.

TEMPERATE HIMALAYA; Kumaon, alt. 6–8000 ft.; Bhotan and Mishmi, *Griffith.* KHASIA MTS., alt. 5–7000 ft.; *Griffith,* &c.

This, I suspect, is only a woolly variety of *C. coccinea,* which, owing to the wetness of the climate, does not occur in Sikkim. Wallich's figure, however, represents a plant of very different habit from that of *C. coccinea,* having long subracemose terminal spikes of rose-pink flowers $1\frac{1}{4}$ in. long. Of the specimens both from Kumaon and the Khasia, many agree with the plate; others with smaller more axillary flowers and less clothed leaves pass into *C. coccinea.* Khasia specimens have often very thick leaves finely rugose on the upper surface, and densely cottony beneath.

3. **C. elegans,** *Wall. Pl. As. Rar.* i. 65, iii. 43, t. 268, and *Cat.* 2084; densely softly tomentose, leaves shortly petioled, flowers in small axillary heads, calyx $\frac{1}{3}$ in. subhemispheric, corolla-tube broad thrice as long as the calyx. *Benth. in DC. Prodr.* xii. 457.

BURMA; on Taong Dong, *Wallich.*

Probably only another variety of *C. coccinea,* which I cannot distinguish from Bentham's var. *parviflora* of that plant, except in the longer corolla.

6538 4. **C. tenuiflora,** *Hook. f.*; branches scaberulous and hirsute, leaves elliptic serrate pubescent, flowers subcapitate on very short lateral villous branches, calyx $\frac{1}{4}$ in., teeth acuminate, corolla 1 in. very slender densely pubescent.

PEGU; Karene Hills, *Rev. F. Mason.* TENASSERIM; at Moulmein, *Parish.*

Apparently a very distinct species, of which the specimens are indifferent; the acuminate calyx-teeth and long slender corolla are very unlike any form of *C. coccinea.*

39. STACHYS, *Linn.*

Herbs or undershrubs. *Leaves* crenate or serrate. *Whorls* axillary and in terminal spikes or racemes. *Calyx* 5–10-nerved, teeth 5 subequal. *Corolla* with usually a ring of hairs within, throat not dilated, upper lip erect; lower spreading, 3-lobed, midlobe the largest. *Stamens* 4, ascending; anthers conniving, cells parallel or diverging. *Style-lobes* subequal. *Nutlets* obtuse.—Species about 160, all temperate and some warm climates, chiefly Oriental.

* *Herbs, stem 4-angled. Whorls many-fld., bracts as long as the calyx.*

1. **S. floccosa,** *Benth. Lab.* 739, and in *DC. Prodr.* xii. 465; stout, tall, erect, densely clothed with soft white wool, leaves petioled ovate or ovate-lanceolate cordate acute crenulate, whorls many-fld. axillary and in a terminal spike, calyx-teeth spinescent, corolla woolly.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5–6000 ft.; *Jacquemont, Falconer,* &c.—DISTRIB. Affghanistan.

Stem 2–4 ft., simple, sometimes as thick below as the little finger, obtusely 4-gonous. *Leaves* 3–4 by 1–2 in., thick, velvety above; petiole ½–1 in., very stout. *Whorls* dense, depressed, villous; bracts nearly equalling the calyx; flowers sessile. *Calyx* ¼ in.; fruiting ⅓ in., villous; teeth triangular, spinous point coloured. *Corolla-tube* shortly exserted. *Nutlets* turgidly obpyriform, smooth.

2. **S. sericea,** *Wall. Pl. As. Rar.* i. 64, and *Cat.* 2077; tall, erect, more or less densely villous with long silky hairs, leaves shortly petioled ovate- or oblong-cordate acute crenate, whorls many-fld. axillary and in terminal spikes, calyx-teeth spinescent, spines coloured. *Benth. Lab.* 537, and in *DC. Prodr.* xii. 465. S. vestita, *Benth. ll. c. in part.* S. splendens, *Wall. l. c.,* and *Cat.* 2075, *Benth. ll. c.,* and in *DC. l. c.* 466, *in part.*

TEMPERATE HIMALAYA; from Nepal to Kashmir, alt. 6–9000 ft.—DISTRIB. Affghanistan, Central Asia.

A most variable plant, differing only in the hairiness from *S. floccosa,* of which it is possibly a form. I cannot distinguish most of the specimens of Bentham's *S. vestita* and *S. splendens* from it, though some plants under the former name may be separated by the usually shorter calyx, the teeth of which have not the yellow spines of *sericea;* and these must be referred to *S. melissæfolia.* The corolla varies in length of tube, which is rarely exserted (*S. splendens*), and in breadth across the lips, of ⅓–⅔ in.; the usual colour is pale pink spotted with purple.

3. **S. melissæfolia,** *Benth. Lab.* 538, and in *DC. Prodr.* xii. 466, *in part;* tall, erect, tomentose or villous with silky hairs, rarely pubescent only, leaves sessile or shortly petioled ovate- or oblong-cordate acute crenate, whorls many-fld. axillary distant, calyx short, teeth triangular acute not spinescent. S. oblongifolia, *Benth. partly (Nepal specimens).* S. splendens, *Wall. in part.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 8–10,000 ft.

Usually a smaller more slender and less hairy silky and leafy plant than *S. sericea,* best distinguished in its typical state by the shorter calyx as broad as long, with the triangular teeth acute or with a thickened tip, not ending in a pale spine; but there

are specimens difficult to refer to either one. The specimens described by Bentham under the names of *sericea, vestita, splendens* and *melissæfolia,* are so mixed up that it is useless to individualize them. *Corolla* colour as of *S. sericea;* tube exserted or not.

** *Herbs, stem 4-angled. Whorls few-fld.; bracts minute.*

4. **S. oblongifolia,** *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 545, and in *DC. Prodr.* xii. 474; erect, pubescent or villous, leaves shortly petioled oblong-lanceolate subacute crenate-serrate, floral longer than the calyx, whorls 2–6-fld. all distant, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. villous, teeth triangular or lanceolate, tips setaceous, corolla-tube included. *Wall. Cat.* 2076, *in part.*

Plains of BENGAL, ASSAM and SILHET; in wet places, *Wallich,* &c.

Annual. *Stem* 1–2 ft., scabrid below. *Leaves* 2–3 by $\frac{3}{4}$–1 in., base broadly cordate; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., floral sessile. *Whorls* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., never spicate. *Calyx* variable, sometimes short and cupular with very broad teeth. *Corolla* very small, pink. *Nutlets* subglobose, smooth.—The form of the leaves best distinguishes this from *S. melissæfolia.*

5. **S. palustris,** *Linn.*; erect, stem scabrid or hispid with reversed hairs, leaves sessile narrowly oblong- or ovate-lanceolate acuminate serrate, base rounded or cordate, floral longer than the calyx, whorls sub-6-fld. all distant, calyx $\frac{1}{3}$ in. hispid, teeth lanceolate, tips spinescent, corolla-tube included. *Benth. in DC. Prodr.* xii. 470; *Boiss. Fl. Orient.* iv. 726; *Reichb. Ic. Fl. Germ.* t. 1211.

WESTERN HIMALAYA; Kashmir, alt. 5–6000 ft.; *Thomson.*—DISTRIB. N. and W. Asia, Europe, N. America.

Herbaceous, 1–2 ft., perennial. *Leaves* 3–4 by $\frac{3}{4}$–1 in., floral leafy. *Whorls* $\frac{1}{2}$–1 in. diam., never spicate. *Calyx-teeth* equalling the tube. *Corolla* small, pink. *Nutlets* broadly obovoid, nearly smooth.

6. **S. sylvatica,** *Linn.*; stem erect hispidly hairy, leaves long-petioled broadly ovate-cordate serrate softly hairy, floral sessile longer than the calyx, whorls few-fld., calyx $\frac{1}{3}$ in., teeth triangular, tips acicular, corolla small, tube exserted. *Benth. in DC. Prodr.* xii. 469; *Boiss. Fl. Orient.* iv. 726; *Reichb. Ic. Fl. Germ.* t. 1211, 1232.

WESTERN HIMALAYA; Kashmir, *Falconer.*—DISTRIB. Europe and N. Asia.

Fœtid when bruised. *Rootstock* creeping, stoloniferous. *Stem* 1–3 ft., rather slender. *Leaves* 2–4 in., radical early withering; petiole of lower often longer. *Whorls* glandular-hairy. *Corolla* $\frac{1}{2}$ in. long, pink. *Nutlets* subglobose.

7. **S. scaberula,** *Vatke in Bot. Zeit.* 1875, 462; erect, stem scabrid with reversed hairs, leaves petioled ovate-cordate acuminate crenate pubescent, floral longer than the calyx sessile, whorls 4–6-fld. distant or upper crowded, calyx $\frac{1}{3}$ in. glandular-pubescent, teeth triangular acuminate, corolla-tube exserted.

KHASIA MTS.; banks of the Kala Panee, alt. 5–6000 ft., *J. D. H. & T. T.*

Rootstock slender, creeping; stem 1–2 ft., simple or branched. *Leaves* 1–2 in., broadly cordate, beneath subscaberulous; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., scabrid. *Calyx* broadly campanulate, teeth shorter than the tube. *Corolla* $\frac{1}{2}$ in. long, white dotted with pink. *Nutlets* subglobose, smooth.

*** *Shrubs or undershrubs, stems terete or nearly so.*

8. **S. tibetica,** *Vatke in Bot. Zeit.* 1875, 447; glabrous or puberulous, much branched, branches slender, leaves shortly petioled oblong ovate lan-

ceolate or linear entire or irregularly lobed, whorls 1–2-fld. all axillary. Stachys, n. 8, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET and NORTHERN KASHMIR, alt. 10–14,000 ft.; *Thomson*, &c.—DISTRIB. Kashgar.

Rootstock stout, woody; stems 1–2 ft., twiggy, much branched. *Leaves* ½–1½ in., obtuse, narrowed into the petiole or sessile, green. *Flowers* sessile. *Calyx* ⅓ in., campanulate, glabrous or villous; teeth as long as the tube, triangular; tips long, pubescent, erect or spreading. *Corolla* ¾–1 in., long, pink, pubescent; tube thrice as long as the calyx; upper lip long, narrow. *Nutlets* ⅛ in., broadly obovoid-oblong.—Near the Persian *S. macrocheilos*, but the tube of the corolla is much longer than the calyx.

9. **S. parviflora,** *Benth. in DC. Prodr.* xii. 490; densely clothed with flocculent white wool, leaves sessile thick elliptic oblong or oblong-ovate or -lanceolate subacute entire or serrate, floral far exceeding the flowers, whorls distant 2–4-fld., calyx ⅛–⅙ in. densely woolly cupular, teeth short acute, corolla very small. *Boiss. Fl. Orient.* iv. 740.

PANJAB PLAINS and HILLS, from the Jhelum eastwards and northwards to Murree.—DISTRIB. Affghanistan.

Erect, branched from the base and upwards; stem and branches very stout, nearly terete. *Leaves* 1–3 in., extremely variable, glabrous and shining or cottony above, upper woolly all over. *Calyx* immersed in wool, fruiting closed over the nutlets with the teeth incurved. *Corolla* red-purple; lips very small, upper short rounded. *Nutlets* enclosed in the ovoid or subglobose calyx, usually 2, turgid, plano-convex, ⅙ in. long, grey, granulate.

40. GALEOPSIS, *Linn.*

Annuals. *Whorls* many-fld., axillary and in terminal leafy spikes. *Calyx* 5-nerved; teeth 5, subequal, spinescent. *Corolla-tube* straight, not annulate; throat dilated; upper lip arched, lower 3-fid, midlobe obcordate or 2-fid; palate with erect teeth at the union of the lips. *Stamens* 4, exserted; anther-cells transversely 2-valved, inner valve rounded, ciliate; outer larger, naked. *Nutlets* rounded, compressed, subreticulate.—Species 3, Europe, N. and W. Asia.

G. Tetrahit, *Linn.*; hispid, nodes thickened, calyx-teeth equalling or exceeding the tube. *Benth. in DC. Prodr.* xii. 198. *Reichb. Ic. Fl. Germ.* t. 1231.

SIKKIM HIMALAYA; fields at Lachen, alt. 11–12,000 ft., *J. D. H.*—DISTRIB. of the genus.

Stem 1–3 ft., hairs spreading and deflexed, nodes very hispid. *Leaves* 1–4 in., ovate or ovate-lanceolate, acute or acuminate, coarsely serrate. *Calyx* ½–⅝ in., teeth straight. *Corolla* ¾–1¼ in., yellow and purple.

41. LEONURUS, *Linn.*

Erect, leafy, stout herbs. *Leaves* lobed. *Whorls* axillary, dense-fld., distant; bracts subulate, flowers small. *Calyx* 5-nerved, turbinate; teeth 5, spreading, spinescent. *Corolla-tube* naked or annulate within, upper lip entire, erect; lower 3-fid, midlobe obcordate. *Stamens* 4; anthers conniving, cells transverse. *Style-lobes* obtuse or subulate. *Nutlets* triquetrous, truncate, smooth.—Species 10, Europe, Asia and America.

* *Corolla-tube annulate within, upper lip flattish, narrowed at the base, lower spreading, midlobe entire.*

1. **L. Cardiaca,** *Linn.*; leaves lanceolate ovate or orbicular lacerate or pinnatifid, corolla with the galea densely villous. *Benth. in DC. Prodr.* xii. 500; *Boiss. Fl. Orient.* iv. 753; *Reichb. Ic. Fl. Germ.* t. 1232, 1233.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–10,000 ft. —DISTRIB. Europe, N. Asia and Asia Minor.

Rootstock stout. *Stem* 2–4 ft., stout, erect. *Leaves* very variable, close set, radical long-petioled, 1–3 in. long, often as broad, base cuneate, lower sometimes multifid, upper palmately lobed. *Whorls* very many; bracts large, lower petioled; bracteoles subulate. *Calyx* $\frac{1}{6}$ in., teeth triangular, spines long. *Corolla* $\frac{1}{2}$ in., rosy or white. *Nutlets* smooth.

L. Cardiaca proper; leaves cordate-ovate serrate or lacerate pubescent or villous beneath.

VAR. *pubescens*; leaves elliptic-lanceolate coarsely serrate finely pubescent. L. pubescens, *Benth. in Wall. Pl. As. Rar.* i. 63, and *Lab.* 518, and in *DC. Prodr.* xii. 499; *Wall. Cat.* 2072.—Kashmir to Kumaon.

VAR. *Royleana*; leaves ovate-lanceolate rhomboid or orbicular or obovate, base rounded or cordate pinnatifidly cut white-tomentose beneath. L. Royleanus, *Benth. ll. c.*; *Wall. Cat.* 2073.—Kashmir to Scinde.

** *Corolla-tube straight, not annulate; upper lip arched, lower suberect or with the midlobe alone spreading obcordate or 2-fid.*

2. **L. sibiricus,** *Linn.*; glabrous or pubescent, leaves pinnati- or palmati-partite, segments linear incised, galea of corolla pubescent. *Benth. in DC. Prodr.* xii. 501; *Wall. Cat.* 2071; *Sm. Exot. Bot.* ii. 67, t. 94; *Sweet Brit. Fl. Gard.* iii. 204. L. tartaricus, *Burm. Fl. Ind.* 127; *Roxb. Fl. Ind.* iii. 8 (*not Linn.*). L. heterophyllus, *Sweet l. c.* ii. 197. Stachys Artemisiæ, *Lour. Fl. Coch.* 365.

Plains of INDIA; from Bengal and Silhet to Coorg, indigenous?—DISTRIB. Tropical Asia, Africa and America.

Annual. *Stems* 2–6 ft. *Leaves* 2–4 in., long-petioled, 3-multi-partite, upper floral entire, all pale beneath; petiole slender. *Whorls* numerous; bracts equalling the calyx, spinescent. *Calyx* $\frac{1}{4}$ in.; teeth spinescent. *Corolla* red. *Stamens* exserted. *Nutlets* smooth (hispid, *Benth.*).

42. LAMIUM, *Linn.*

Annual or perennial hairy herbs. *Whorls* axillary, many-fld. or in leafy heads, bracteoles 0 or subulate. *Calyx* 5-nerved; teeth 5, equal or the upper longer. *Corolla-tube* annulate or not within, throat dilated; upper lip arched; lower spreading, 3-lobed, midlobe broad contracted at the base. *Stamens* 4; anthers conniving; cells diverging. *Style-lobes* subulate. *Nutlets* triquetrous, truncate, smooth, scaly or tubercled.—Species 40, Europe, Temp. Asia and N. Africa.

1. **L. rhomboideum,** *Benth. Lab.* 509, and in *DC. Prodr.* 504; dwarf, densely softly velvety, leaves very large crowded rhomboid rugose crenate, flowers very large, corolla thrice as long as the calyx, anthers hirsute. *Dcne. in Jacquem. Voy. Bot.* t. 135. Erianthera rhomboidea, *Benth. in Hook. Bot. Misc.* iii. 380.

ALPINE WESTERN HIMALAYA and WESTERN TIBET; in stony debris from Kashmir to Kunawur, alt. 12–15,000 ft.—DISTRIB. Affghanistan, Turkestan.

Stem 6–12 in., very stout, often as thick as a goose-quill, more slender below where it is sunk deep in the ground, flexuous, densely tomentose, rarely divided. *Leaves*, lower small, upper 2–4 in. diam., base suddenly contracted into a very thick short woolly petiole; veins flabellate and reticulate, crenatures shallow or deep. *Bracts*

subulate. *Flowers* few, $1\frac{1}{2}$ in. long, subsessile. *Calyx* $\frac{3}{4}$ in., woolly; teeth lanceolate. *Corolla* purplish; tube straight, naked within; galea broad, woolly; lateral lobes ovate, entire.—A most remarkable plant.

2. **L. amplexicaule,** *Linn.*; annual, leaves petioled orbicular inciso-crenate, whorls distant, calyx small pubescent, teeth equalling the tube converging in fruit, corolla-tube long slender nearly straight. *Wall. Cat.* 2074; *Don Prodr.* 111; *Benth. in DC. Prodr.* xii. 508; *Boiss. Fl. Orient.* iv. 760; *Reichb. Ic. Fl. Germ.* t. 1204, f. 2.

The PANJAB, TEMPERATE HIMALAYA and WESTERN TIBET; in fields, alt. 2–10,000 ft.—DISTRIB. N. and W. Asia, Europe, N. Africa.

Hairy or glabrescent, 4–10 in., branched from the base. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in., lower long-petioled, almost lobulate; base rounded or cordate; floral sessile, broader than long. *Corolla* $\frac{3}{4}$ in., or shorter, very slender, rosy, pubescent. *Nutlets* scaly.

3. **L. album,** *Linn.*; perennial, glabrous or hispidly hairy, leaves all petioled ovate-cordate crenate or serrate, upper whorls crowded lower distant, calyx-teeth longer than the tube, points long, corolla-tube curved gibbous at the base below. *Benth. in DC. Prodr.* xii. 510; *Boiss. Fl. Orient.* iv. 763; *Reichb. Ic. Fl. Germ.* t. 1205. L. petiolatum, *Royle ex Benth. in Hook. Bot. Misc.* iii. 381, *Lab.* 513, and in *DC. Prodr.* xii. 509.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–10,000 ft. —DISTRIB. N. and W. Asia, Europe, N. Africa.

Rootstock creeping, stoloniferous; stem 6–18 in., ascending. *Leaves* 1–3 in., lower long-petioled, rarely incised; floral shortly petioled. *Calyx* glabrous or hispid with long hairs; teeth triangular-subulate, ciliate or not. *Corolla* $\frac{3}{4}$–1 in.; upper lip vaulted, villous; lateral lobes various, with or without a minute basal tooth; ring in the tube oblique, tube constructed below it. *Nutlets* naked.

43. ROYLEA, *Wall.*

A tall hoary undershrub. *Leaves* shortly petioled, deeply crenate-toothed or lobed. *Whorls* all axillary, 6–10-fld.; bracteoles small, subulate. *Calyx* 10-nerved, lobes 5, large, obovate-oblong, obtuse, rigid, reticulate. *Corolla-tube* included, annulate within; upper lip erect, entire; lower spreading, 3-fid, midlobe entire. *Stamens* 4, ascending; anthers conniving, cells diverging. *Style-lobes* subequal. *Nutlets* obovoid-oblong, obtuse, smooth.

R. elegans, *Wall. Pl. As. Rar.* i. 57, t. 74, and *Cat.* 2069; *Benth. Lab.* 601, and in *DC. Prodr.* xii. 516. Phlomis calycina, *Roxb. Fl. Ind.* iii. 2. Ballota cinerea, *Don Prodr.* 111.

SUBTROPICAL WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 2–5000 ft., *Wallich*, &c.

Much branched, 3–5 ft. high; branches slender, terete, finely tomentose. *Leaves* 1–$1\frac{1}{2}$ in., ovate, tomentose beneath, base cuneate; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Fruiting calyx* $\frac{1}{2}$–$\frac{2}{3}$ in., tube deeply ribbed, lobes as long. *Corolla* narrow, $\frac{1}{2}$ in., white or pinkish. *Nutlets* $\frac{1}{8}$ in.—Odour of lemons.

44. OTOSTEGIA, *Benth.*

Shrubs. *Whorls* axillary, many-fld.; outer bracteoles often spinescent. *Calyx* 10-nerved; limb dilated, membranous; upper lip very short, 3-angled or -toothed; lower very large, broad, angled or shortly 4-toothed. *Corolla-tube* included, annulate within; upper lip erect, concave, crown villous;

lower spreading, 3-fid, midlobe broad. *Stamens* 4, ascending; anthers conniving, cells at length divaricate. *Style* subequally 2-fid. *Nutlets* obovoid, obtuse.—Species 8, Oriental.

O. limbata, *Benth. mss.*; hoary, leaves subsessile elliptic-lanceolate obtuse quite entire nerveless, bracts spinescent. Ballota limbata, *Benth. Lab.* 743, and in *DC. Prodr.* xii. 521.

PANJAB; lower hills in rocky places west of the Jhelum to the Salt range, *Falconer, Jacquemont*, &c.

A small grey spiny bush; branches tomentose, white, terete; spines $\frac{1}{2}$–$\frac{3}{4}$ in. *Leaves* 1 in., base narrowed, hoary on both surfaces, floral exceeding the calyces. *Whorls* distant; lower bracts spinescent, upper dilated, pungent. *Calyx* villous, throat bearded; flowering $\frac{1}{6}$ in., turbinate, with a broad membranous 5-toothed limb, which in fruit expands into a reticulated 5-angled cup, $\frac{3}{8}$ in. diam., with often toothed margins. *Corolla* $\frac{1}{2}$ in., tube short; upper lip very long, villous. *Stamens* exserted. *Nutlets* $\frac{1}{3}$ in., solitary?, flattened, smooth.

45. LEUCAS, *Br.*

Woolly or villous rarely glabrate herbs or undershrubs. *Whorls* axillary, usually distant. *Calyx* 10-nerved, striate; mouth equal or oblique, equally or unequally 6–10-toothed. *Corolla-tube* included, annulate or not within; upper lip erect, concave, crown villous; lower spreading, 3-fid, midlobe very large. *Stamens* 4, ascending; anthers conniving, cells divaricate at length confluent. *Style* subulate, posterior lobe obsolete. *Nutlets* ovoid, triquetrous, obtuse.—Species 50, Asiatic and African.

Sect. 1. **Hemistoma.** *Calyx* membranous, mouth oblique, split above, produced below. *Whorls* dense, many-fld., bracteoles equalling the calyx.

1. **L. urticæfolia,** *Br. Prodr.* 504; annual, leaves ovate coarsely toothed, whorls remote globose, calyx cylindric reticulated $\frac{1}{3}$–$\frac{1}{2}$ in. pubescent or villous, lower lip truncate, teeth minute. *Benth. in DC. Prodr.* xii. 524; *Wight Ill.* t. 176 *b.* f. 10, and *Ic.* t. 1451; *Dalz. & Gibs. Bomb. Fl.* 212; *Boiss. Fl. Orient.* iv. 778. L. membranacea, *Benth. in Wall. Cat.* 2052. Phlomis urticæfolia, *Vahl Symb.* iii. 76; *Roxb. Fl. Ind.* iii. 11.

UPPER GANGETIC PLAIN; from Patna to the Panjab, and southward to SCINDE, COROMANDEL and MALABAR.—DISTRIB. Beluchistan, Arabia, Abyssinia.

Annual. *Stem* 6–18 in., hoary. *Leaves* 2–3 in., petioled, glabrous or hoary. *Whorls* 1 in. diam.; bracts ciliate. *Corolla* white, not annulate.

Sect. 2. **Ortholeucas.** *Calyx* straight, mouth nearly equal, throat naked; teeth 10, triangular, subulate or lanceolate. *Whorls* numerous, axillary; bracts usually minute, setaceous (long in 4. *Helferi*, 13. *marrubioides* and 15. *pubescens*).

* Perennial rooted. Branches terete. Calyx-teeth not $\frac{1}{4}$ the length of the tube.

2. **L. teres,** *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 608, and in *DC. Prodr.* xii. 526; shrubby, hoary-pubescent, branches very slender terete, leaves very shortly petioled elliptic obtuse subserrate, whorls few-fld., bracts minute, calyx-teeth minute subulate. *Wall. Cat.* 2060.

BURMA; banks of the Irawaddi, *Wallich.*

Branches long, hairs deflexed. *Leaves* $\frac{1}{2}$–1 in., scaberulous above, tomentose

beneath; petiole $\frac{1}{8}$ in. *Calyx* shortly pedicelled, $\frac{1}{6}$–$\frac{1}{4}$ in. *Corolla* very small. *Nutlets* $\frac{1}{16}$ in.

3. **L. nepetæfolia,** *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 609, and in *DC. Prodr.* xii. 527; shrubby, tomentose, branches terete, leaves petioled orbicular-ovate obtuse coarsely crenate, whorls few-fld., bracts setaceous, calyx-teeth triangular. *Wall. Cat.* 2526.

DECCAN PENINSULA; at Pullejmadam ("in a journey to Hydrabad," *ex Rottler mss.*).

Branches hoary; hairs spreading, yellow. *Leaves* 1–1½ in., pubescent above, tomentose beneath; petiole ½ in., very slender. *Calyx* $\frac{1}{3}$–½ in., villous; teeth short. *Corolla* small. *Nutlets* $\frac{1}{16}$–$\frac{1}{12}$ in., grey.

4. **L. Helferi,** *Hook. f.*; floccose with soft spreading white wool or glabrate, stem procumbent very slender flexuous terete, leaves shortly petioled ovate obtuse crenate, whorls few-fld., bracts slender short or long, calyx ¼ in. villous, teeth subulate spreading.

TENASSERIM; *Helfer.*

Stem 1–2 ft., wiry, sparingly branched; wool on branches and leaves very fine and long, easily removed. *Leaves* ½–1 in., membranous, sometimes silky beneath; petiole ¼–½ in., very slender. *Corolla* very small.—The specimens are far from satisfactory.

** Perennial rooted. Branches 4-angled, hairs on them erect or spreading (not deflexed). Calyx-teeth not ¼ the length of the tube.

5. **L. lanata,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 607, and in *DC. Prodr.* xii. 525; everywhere densely softly woolly or subsilky, branches stout, their hairs erect, leaves mostly sessile thick ovate or oblong obtuse or acute crenate, whorls many-fld., bracts setaceous, calyx truncate, teeth minute erect. *Wall. Cat.* 2055. L. collina, *Dalz. in Hook. Kew Journ.* ii. 338; *Dalz. & Gibs. Bomb. Fl.* 211. Marrubium mollissimum, *Don Prodr.* 112.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 3–8000 ft. BANDA; *Edgeworth.* BEHAR; on Parusnath, *J. D. H.*, &c. DECCAN PENINSULA, dry hills in the west from the Concan to the Nilghiris.—DISTRIB. S. China.

Rootstock stout, woody; stem 2–3 ft., often woody; branches stout, obtusely 4-angled. *Leaves* 1–3 in., lower shortly petioled, sometimes silky beneath, nerves above impressed. *Whorls* dense-fld. *Calyx-teeth* variable, always very short.—Dalzell's *L. collina* is in no point different enough to be a marked variety; some states of it have the leaves beautifully silky beneath. The Parusnath specimens have a smaller calyx and browner more scurfy tomentum on the branches. The hairs of the branches at once distinguish this from *L. montana.* A variety with longer setaceous calyx-teeth and bracts half as long as the calyx, is in Dalzell's Herbarium, marked "*L. zeylanica.*"

*** Perennial rooted. Branches 4-angled, hairs on them deflexed (also spreading in *L. pilosa*). Calyx-teeth not $\frac{1}{3}$ the length of the tube.

† *Whorls many-fld.; few-fld. in impoverished states and varieties of some.*

6. **L. chinensis,** *Br. Prodr.* 504; densely tomentose, leaves shortly petioled broadly ovate acute or obtuse crenate, whorls few-fld., calyx $\frac{1}{3}$–½ in. funnel-shaped, teeth equal spreading broadly triangular, tip spinulose. *Benth. in DC. Prodr.* xii. 524; *Wall. Cat.* 2527. Phlomis chinensis, *Retz Obs.* ii. 19.

SOUTH DECCAN; Pulney Hills, *Wight*; Anamallay and Balarangar Hills, *Beddome*.—DISTRIB. China.

Somewhat shrubby, sometimes only hoary. *Leaves* 1–2½ in., membranous or coriaceous, upper sessile; petiole ¼–½ in. *Calyx* pedicelled; bracts setaceous.—Calyx of the section *Astrodon*, but the mouth not villous, and the bracts are minute.

VAR. *lanata*; densely clothed with woolly tomentum, calyx-teeth not awned.—Vellyengry Hill, *Wight*.—As densely clothed as *L. lanata*.

7. **L. montana,** *Spreng. Syst.* ii. 742; shrubby, all over densely softly woolly or tomentose, leaves thick shortly petioled ovate or ovate-rotundate obtuse crenate, whorls many-fld., calyx ¼–⅓ in. subcylindric, teeth minute erect. *Wall. Cat.* 2056; *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 607, and in *DC. Prodr.* xii. 525. ? L. Hamiltoniana, *Benth. ll. c.*; *Wall. Cat.* 2525. Phlomis montana, *Roth Nov. Sp.* 263; *Roxb. Fl. Ind.* iii. 8.

DECCAN PENINSULA; *Heyne, Wight*. Pulney Hills and Bellary, *Beddome*. BEHAR; Monghir, *Hamilton*; on Parusnath, alt. 4,5000 ft., *Clarke*.

Lower branches woody, upper 4-gonous, with deflexed hairs. *Leaves* 1–2 in., velvety; petiole 0–½ in. *Calyx* subsessile; bracts minute.—I doubt if it is possible to determine by descriptions what Roth's *Phlomis montana* was. In Rottler's Herbarium there is under this name a mixture of several things. I doubt the species being distinct from *L. mollissima*. *L. Hamiltoniana*, Benth., is I think referable here.

VAR. *Wightii*; calyx ½ in. long. *L. montana*, Herb. Wt. propr.

8. **L. mollissima,** *Wall. Pl. As. Rar.* i. 62, and *Cat.* 2054; slender, much branched, hoary-tomentose, leaves sessile or shortly petioled ovate-lanceolate or ovate acute rarely obtuse serrate, calyx ¼–⅓ in. tomentose or woolly cylindric straight, teeth very short usually slender. *Benth. Lab.* 607, and in *DC. Prodr.* xii. 525. L. pilosa, *var.* pubescens, *Benth. in Wall.* and *DC. ll. c.*

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Kumaon, *Falconer*, &c. KHASIA MTS., alt. 1–4000 ft., *Griffith*, &c. The CONCAN, *Stocks*, &c. CENTRAL INDIA; Chota Nagpore, *Clarke*. CEYLON; N. of the island, *Gardner*.—DISTRIB. China.

More slender than *L. montana*, and never so densely woolly, with more acute calyx-teeth; but these are sometimes very short and broad.

Bentham describes the flower as "white? but oftener purple."

VAR. *scaberula*; more glabrous, calyx hispid.—Central India and Khasia Mts., *Clarke*.

VAR. *angustifolia*; puberulous, very slender, leaves membranous linear-lanceolate subentire. L. angustifolia, *Wall. Pl. As. Rar.* i. 62; *Cat.* 2064; *Benth. in DC. l. c.* 527.—Nepal, *Wallich*.

VAR. *strigosa*; branches very slender and leaves above strigosely pubescent, leaves sessile elliptic- or linear-lanceolate subacute subserrate tomentose beneath, whorls few-fld. L. strigosa, *Benth. in Wall. l. c.*, *Lab.* 608, and in *DC. l. c.* 526; *Wall. Cat.* 2059.—Burma; at Prome, *Wallich*. Rangoon, *M'Clelland*.

9. **L. ovata,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 607, and in *DC. Prodr.* xii. 525; branches long slender tomentose, leaves large sessile broadly ovate-cordate subcrenate, tip rounded, pubescent above, woolly beneath, whorls many-fld., bracts minute, calyx ¼ in. straight villous, teeth minute, tips acicular. *Wall. Cat.* 2057.

BURMA; banks of the Irawaddi, *Wallich*.

This may be another form of *L. mollissima*, but is a very different-looking plant.

Branches 3 ft., 4-angled; hairs deflexed. *Leaves* 3 by 2 in., very obscurely crenate.—Described from a single specimen.

10. **L. pilosa,** *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 609, and in *DC. Prodr.* xii. 526 (excl. var. β); branches very slender with appressed deflexed and long spreading hairs, leaves petioled membranous ovate acuminate coarsely serrate sparsely hairy on both surfaces, upper sessile, whorls few-fld., calyx ¼ in. straight hispid, teeth very short, tips acicular. *Wall. Cat.* 2058.

BURMA; banks of the Irawaddi, *Wallich.*

Branches long, leaves and whorls very distant. *Leaves* 3 by 1½ in.; petiole ⅓ in. —Described from a single specimen; the long spreading hairs are quite unlike those of any other species in this section.

†† *Whorls* 1–2-*fld.*

11. **L. procumbens,** *Desf. in Mem. Mus.* xi. 7, t. 3; procumbent, nearly glabrous, branches very long and slender, leaves petioled membranous elliptic-ovate or lanceolate acute subserrate, flowers 1–3 pedicelled, bracts minute, calyx ⅓–½ in. straight glabrous, teeth short lanceolate acuminate. *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 610, and in *DC. Prodr.* xii. 527, *in part.* L. biflora, *Wall. Cat.* 2063, *in part.* Phlomis biflora, *Roxb. Fl. Ind.* iii. 12, *in part.*

BENGAL PLAINS; *Roxburgh,* &c. CANARA; *Ritchie,* &c. MYSORE; *Heyne,* &c.

Branches from a woody rootstock, 2–3 ft.; angles and tips puberulous. *Leaves* ½–1½ in., base acute; petiole ⅙–½ in. *Calyx* with the pedicel sometimes half as long as the tube.

**** Perennial rooted. Calyx-teeth ¼–½ the length of the tube.

12. **L. biflora,** *Br. Prodr.* 504; procumbent, pubescent, branches long slender, leaves petioled ovate elliptic or oblong coarsely serrate or crenate, flowers 1–2 subsessile, bracts minute, calyx ¼–⅓ in. straight hispid, teeth subulate ¼–½ the length of the tube. *Wall. Cat.* 2529; *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 610, and in *DC. Prodr.* xii. 527; *Wight Ic.* t. 866 (bad); *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211. L. procumbens, *Thwaites Enum.* 240. Phlomis biflora, *Vahl Symb.* iii. 77; *Roxb. Fl. Ind.* iii. 12. Nepeta indica, *Burm. Fl. Ind.* 126, and *Thes. Zeyl.* t. 63, f. 1.

DECCAN PENINSULA, in dry places from the Concan southward. CEYLON; from the sea to 8000 ft., *Thwaites.*

Habit and foliage of *L. procumbens,* distinguished by its pubescence and long calyx-teeth, and native country.

13. **L. marrubioides,** *Desf. in Mem. Mus.* xi. 6, t. 3, f. 1; stem very stout, leaves sessile or shortly petioled thick ovate rounded or broadly ovate-cordate crenate velvety above densely white woolly beneath, whorls densely many-fld., calyx woolly, teeth subulate ⅓–½ as long as the tube. *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 611, and in *DC. Prodr.* xii. 528; *Thwaites Enum.* 240.

WEST DECCAN PENINSULA, on the Ghats from the Concan to Travancore. CEYLON, common.

Stem 1–2 ft., simple or sparingly branched, densely white-tomentose with reflexed or spreading hairs. *Leaves* 1–2 in. long and broad, or more ovate, rarely acute, often rugose above, white beneath; petiole ¼–½ in., stout. *Whorls* very dense and woolly or silky; bracts villous, often equalling the calyx-tube. *Calyx-teeth* very variable in length.

VAR. *pulneyensis*; leaves ovate acute not so thick, calyx less densely tomentose, teeth flexuous as long as the tube.—Pulney Mts., *Wight.*

14. **L. angularis,** *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 608, and in *DC. Prodr.* xii. 526; pubescent or tomentose, branches long ascending or erect, leaves shortly petioled subacute or obtuse coarsely crenate-serrate or toothed, whorls few- or many-fld., bracts minute, calyx ½ in. hispid, teeth very slender ciliate half as long as the tube. L. pubescens, *Thwaites Enum.* 240.

NILGHIRI HILLS; *Wight*, &c. CEYLON; *Walker*, &c.—DISTRIB. Java.
Stem and *branches* rather slender, several feet long, straggling. *Leaves* 1–2 in., pubescent on both surfaces; petiole ¼–½ in. *Whorls* lax-fld.; flowers shortly pedicelled, bracts subulate.—L. javanica, *var.* Horsfieldiana, of Java appears to be this.

15. **L. pubescens,** *Benth. Lab.* 610, and in *DC. Prodr.* xii. 628; pubescent or tomentose, rather stout, erect, leaves petioled rounded or ovate coarsely crenate-serrate, whorls densely many-fld., bracts linear nearly as long as the calyx or less, calyx ½ in. hispid, teeth subulate ciliate half as long as the tube. L. marrubioides, *Wall. Cat.* 2524.

DECCAN PENINSULA; *Wight.* Pulney Hills, *Beddome.*
Differs from *L. angularis* in the stouter erect habit, usually rounder longer-petioled leaves, and especially in the long ciliate bracts.

***** Annuals. *Stem* 4-angled.

16. **L. flaccida,** *Br. Prodr.* 505; pubescent or tomentose, branched from the base, branches weak, hairs deflexed, leaves membranous long-petioled ovate or oblong obtuse crenate, whorls few-fld., bracts minute, calyx ¼ in. hairy or villous, teeth ½ the length of the tube, alternate ones with capillary points. *Benth. Lab.* 609, and in *DC. Prodr.* xii. 526. L. parviflora, *Benth. in Wall. Pl. As. Rar. l. c.*; *Wall. Cat.* 2061. L. melissæfolia, *Benth. in Wall. l. c.* L. melissæflora, *Benth. in Wall. Cat.* 2062. L. decemdentata, *Smith in Rees Cyclop.*; *Benth. in DC. l. c.*

BURMA and TENASSERIM; *Wallich, Griffith.*—DISTRIB. Siam, Malay and Pacific Islands, Australia, W. Indies (introduced).
A slender flaccid annual; stem 6–8 in.; hairs on stem deflexed. *Leaves* 1–2 in., base cuneate; petiole ½–1 in., very slender. *Calyx* slightly curved, pedicelled. *Corolla-tube* much exserted.

17. **L. longifolia,** *Benth. Lab.* 744, and in *DC. Prodr.* xii. 527; erect, branched above, scaberulous or hispid, leaves sessile narrowly linear quite entire, whorls few-fld., bracts minute, calyx ¼ in. sessile hispid turbinate truncate, teeth minute. *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 210.

The CONCAN; at Poona, &c., *Jacquemont, Stocks*, &c.
A foot high, rigid; stem naked below; hairs erect or spreading. *Leaves* 1¾–2½ by $\frac{1}{10}$–¼ in., obtuse or subacute. *Calyx-mouth* villous. *Corolla* ½ in., tube exserted; upper lip very short, lower very much longer and broader.—An unmistakable species.

Sect. 3. **Astrodon.** *Calyx* straight, mouth equal, throat villous; teeth 10, usually stellately spreading. *Whorls* terminal and axillary, densely many-fld.; bracteoles usually about equalling the calyx (setaceous in *L. suffruticosa*). (See also 28. *L. stricta* and 34. *diffusa.*)

* *Leaves quite entire.*

18. **L. suffruticosa,** *Benth. Lab.* 611, and in *DC. Prodr.* xii. 528; a low shrub, branches densely fulvous-tomentose and hispid, leaves 1 in. sessile coriaceous linear obtuse hispid above white-tomentose beneath, whorls 1–2 terminating very long scapiform branches, calyx $\frac{1}{4}$ in. villous turbinate, teeth spinulose erect. *Wight Ic.* t. 1454.

SOUTH DECCAN; Nilghiri Hills, common in pastures, alt. 7000 ft., *Wight,* &c. Anamallay Hills, *Beddome.*

Rootstock very long and stout; branches ascending, rigid, terete, 4–6 in. (without the scape), appressed hairs erect, bristles spreading. *Leaves* quite entire, margins recurved. *Scapes* 6-10 in., tomentose only. *Whorls* $\frac{1}{2}$–1 in. diam., with one or a pair of floral leaves; bracts setaceous, half the length of the calyx. *Calyx* sessile, villi of throat shorter than the teeth. *Corolla-tube* included, galea most densely villous. *Nutlets* $\frac{1}{8}$ in., oblong, terete, smooth.

19. **L. rosmarinifolia,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 612, and in *DC. Prodr.* xii. 528; a low excessively branched strigosely tomentose shrub, leaves 1 in. sessile fascicled linear obtuse softly villous beneath, whorls 1–2 terminating short scapiform branches, calyx $\frac{1}{4}$ in. turbinate hispidly villous, teeth very minute erect. *Wall. Cat.* 2521; *Wight Ic.* t. 1455.

NILGHIRI MTS.; alt. 7–8000 ft., in any soil, *Wight,* &c.

Stem woody, terete, fastigiately branched, hairs erect. *Leaves* $\frac{1}{10}$–$\frac{1}{6}$ in. diam., rigid, grey; margins quite entire, revolute. *Whorls* often solitary, $\frac{3}{4}$–1 in. diam., hemispheric, villous, with a pair of floral leaves; bracts linear, rigid, nearly equalling the calyx. *Calyx* sessile, closing over the fruit, villi of throat white, much exceeding the teeth. *Nutlets* oblong, $\frac{1}{10}$ in., obtusely trigonous.

20. **L. helianthemifolia,** *Desf. in Mem. Mus.* xi. 2, t. 1, f. 1; a low shrub, densely softly subsilkily villous (white or buff) tomentose, leaves opposite and ternate $\frac{3}{4}$–1$\frac{1}{4}$ in. sessile coriaceous linear-oblong obtuse, whorls few few-fld., calyx $\frac{1}{4}$ in. turbinate densely woolly, teeth minute erect. *Benth. Lab.* 612, and in *DC. Prodr.* xii. 528. L. ternifolia, *Desf. l. c.* t. 1, f. 2; *Bent. ll. c.*; *Wight Ic.* t. 1453.

SOUTH DECCAN; Pulney, Nilghiri and Anamallay Hills, alt. 5-7000 ft., *Wight,* &c.

Stem woody, terete, much branched; branches 6–12 in., rigid, erect; hairs spreading or erect. *Leaves* $\frac{1}{6}$–$\frac{1}{3}$ in. diam., sometimes narrowed from the middle downwards; margin revolute, quite entire. *Whorls* $\frac{1}{2}$–$\frac{3}{4}$ in. broad, often crowded, dense-fld.; bracts almost equalling the calyx, subulate, tomentose. *Calyx* sessile, villi of the mouth as long as the teeth. *Corolla* very short. *Nutlets* $\frac{1}{8}$ in., oblong.

21. **L. lanceæfolia,** *Desf. in Mem. Mus.* xi. 5, t. 2, f. 2; tall, erect, shrubby, stem stout rufous-tomentose, leaves 3–4 in. petioled coriaceous lanceolate subacute scaberulous above white-tomentose beneath, nerves distinct, whorls axillary many- and dense-fld., calyx $\frac{1}{4}$ in. campanulate pubescent or tomentose, teeth minute spinulose spreading. *Benth. Lab.* 61, and in *DC. Prodr.* xii. 612; *Wight Ic.* t. 1452. L. lanciformis, *Wall. Cat.* 2759.

NILGHIRI MTS., alt. 6–8000 ft., *Wight,* &c., common.

Tall, 6–8 ft., very stout, "forming great clumps" (Wight); stem terete, hairs erect. *Leaves* $\frac{1}{2}$–1 in. diam., subacute, dark above when dry, grey beneath with reddish silky veins; floral similar. *Whorls* 1 in. diam.; bracts linear-lanceolate, shorter than the calyx. *Calyx* sessile, hairs of mouth shorter than the teeth. *Corolla* small, tube included.

** *Leaves more or less serrate or crenate.*

22. **L. stelligera,** *Wall. Pl. As. Rar.* i. 61, and *Cat.* 2049; herbaceous, erect, branched, pubescent or tomentose, leaves 2–4 in. shortly petioled elliptic-lanceolate subacute obtusely serrate, whorls large crowded many- and dense-fld., calyx $\frac{1}{4}$–$\frac{3}{4}$ in. tubular-campanulate scabrid or tomentose, teeth thick triangular subulate spreading and recurved longer than the villi of the mouth. *Benth. Lab.* 61, and in *DC. Prodr.* xii. 529; *Dalz. & Gibs. Bomb. Fl.* 211. L. hamatula, *Arn. Pugill. Pl. Ind. Or.* 37; *Benth. in DC. l. c.*

CEYLON; on the Ghats, *Dalzell*; Warree country, *Stocks*; Belgaum, *Ritchie.*
Stem 2–3 ft.; branches obtusely 4-gonous, hairs spreading. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. diam., green, scaberulous or glabrate above, pubescent beneath, narrowed into the petiole. *Whorls* 1–1$\frac{1}{2}$ in. diam.; bracts linear-lanceolate, nearly as long as the calyx. *Calyx* very variable in size, fruiting membranous, naked below the middle; teeth rarely spinescent, tomentose. *Nutlets* $\frac{1}{12}$ in., oblong.

23. **L. eriostoma,** *Hook. f.*; suffruticose, hispidly hairy, woolly or tomentose, leaves 1$\frac{1}{2}$–4 in. shortly petioled narrowly linear-lanceolate or oblong obtuse obtusely serrate, whorls axillary many- and dense-fld., bracts equalling the calyx plumose or ciliate, calyx $\frac{1}{4}$–$\frac{1}{2}$ in. tubular-funnel-shaped villous above the middle, teeth very minute much shorter than the dense ring of white villi in the mouth. Phlomis eriostoma, *Heyne mss.*

DECCAN PENINSULA; Western Ghats, from the Concan to the Nilghiris.
Branches 6–10 in., stout, nearly terete. *Leaves* very variable in length, nerves unpressed above. *Whorls* $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Calyx* naked below the middle. *Corolla* very small, tube included. *Nutlets* $\frac{1}{10}$ in., oblong.—There are several varieties of this.

VAR. *Heynii*; hispidly hairy on the branches and leaves, hairs spreading, leaves 2–3 in.—Wynaad, *Heyne.*

VAR. *longifolia*; hoary-tomentose, leaves 3–4 in. nearly glabrous. *Herb. Wight*, &c.

VAR. *latifolia*; very robust, villously tomentose, leaves broader elliptic oblong or lanceolate, 2–3 by 1–1$\frac{1}{2}$ in., whorls large globose 1$\frac{1}{2}$ in. diam. *Herb. Wight.*

VAR. *lanata*; branches clothed with dense long soft white spreading hairs, leaves 1–1$\frac{1}{2}$ in. oblong lanceolate villous on both surfaces.—Nilghiris and Bababoodan Hills.—L. lepistoma, *Herb. Wight.*

VAR. *Stocksii*; branches densely clothed as in var. *lanata*, but tomentum shorter and whiter, leaves subsilky beneath 1–1$\frac{1}{2}$ in.

24. **L. lamiifolia,** *Desf. in Mem. Mus.* xi. 4, t. 2, f. 1; tall, shrubby below, branches very stout square and petioles hirsute with long brown hairs, leaves 3–5 in. shortly petioled ovate subacute crenate-serrate villous above densely tomentose beneath, whorls subsolitary subglobose many- and dense-fld., calyx $\frac{1}{2}$ in. subcampanulate villous, teeth slender erect longer than the villi of the mouth ciliate, corolla-tube included. *Benth. Lab.* 613, and in *DC. Prodr.* xii. 529.

NILGHIRI HILLS, alt. 6500–7500 ft.; *Wight*, &c.
Much the largest and largest-leaved species, 8 ft. high, branches $\frac{1}{4}$ in. diam. *Leaves* 1$\frac{1}{2}$–2$\frac{1}{2}$ in. broad, base sometimes cordate. *Whorls* terminal, rarely 2 on the same branch, 1$\frac{1}{2}$ in. diam.; bracts exceeding the calyx, outer linear-lanceolate, inner filiform. *Calyx* membranous, teeth about $\frac{1}{3}$ the length of the tube, villi of the mouth sparse. *Corolla* small. *Nutlets* $\frac{1}{8}$ in. long, oblong.

25. **L. vestita,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 613 (*excl. Silhet*), and in *DC. Prodr.* xii. 530; tall, herbaceous, branches square and petioles hirsute, leaves shortly petioled 2–4 in. ovate-lanceolate acute ser-

rate pubescent above tomentose beneath, whorls subsolitary and terminal many- and dense-fld., calyx $\frac{1}{2}$–$\frac{2}{3}$ in. tubular narrowed below villous, teeth slender erect ciliate longer than the villi of the mouth, corolla large. *Wight Ic.* t. 338.

SOUTH DECCAN PENINSULA; *Wight.* Pulney and Balaramgan Hills (Mysore), *Beddome.*

A more slender plant than *L. lamiifolia*, apparently annual, more sparsely hairy, with narrower leaves, smaller heads, longer calyx and larger corolla.

VAR. *oblongifolia*; shorter, stem woody below, leaves smaller $1\frac{1}{2}$–2 in. more oblong and villous above.—Courtallam, *Wight.*

VAR. *sericostoma*; branches with soft spreading hairs, leaves silkily villous, calyx-teeth shorter than the long white silky hairs of the mouth.—Anamallay Hills, *Beddome.*

VAR. *angustifolia*; tall, branches with soft spreading hairs, leaves 2–3 by $\frac{1}{2}$ in. elliptic-lanceolate obtuse, calyx-teeth as long as two-thirds of the tube.—Sisparah, *Wight*; Palghat high range, *Beddome.*

26. **L. hirta,** *Spreng. Syst.* ii. 743; villously hirsute or scabrid, stem woody below, leaves 1–2 in. sessile or shortly petioled elliptic or linear oblong obtuse obscurely toothed, whorls solitary terminal, bracts as long as the scabrid turbinate calyx, calyx-teeth recurved equalling or shorter than the copious villi of the mouth. *Benth. Lab.* 613, and in *DC. Prodr.* xii. 530. L. helianthemifolia, *Benth. in Wall. Pl. As. Rar.* i. 61; *Wall. Cat.* 2053, *non Desf.* L. rufescens, *Benth. in Wall. Cat.* 2053. Phlomis hirta, *Heyne in Roth Nov. Sp.* 264.

DECCAN PENINSULA; Bangalore, *Rottler*; Nilghiri, Mysore and Shevaghery Hills, *Wight.*

Probably a dry country or locality form of *L. vestita*, much smaller, more scabridly hirsute or villous, with very much smaller leaves and calyces and longer villi of the mouth than the latter. The hairs on the branches are deflexed or spreading, rarely appressed.

VAR. *prostrata*; smaller, more slender, branches prostrate or ascending, leaves $\frac{1}{2}$–1 in. broadly ovate often petioled, villi of calyx-mouth shorter.—Anamallay and Nilghiri Hills, alt. 6–8000 ft.

VAR.? *Beddomei*; erect, softly villous with spreading hairs, leaves 2–$2\frac{1}{2}$ in. linear-oblong subsilkily villous on both surfaces, whorls in several axils, calyx $\frac{1}{2}$ in., teeth very small recurved triangular subulate spinescent longer than the villi of the mouth.—Chambra Peek, Wynaad, alt. 5000 ft., *Beddome.*

27. **L. ciliata,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 614, and in *DC. Prodr.* xii. 530; stem and branches hirsute with spreading and deflexed hairs, leaves petioled 2–4 in. ovate or lanceolate coarsely serrate pubescent or glabrate, whorls globose large many- and dense-fld. terminal and axillary, bracts as long as the calyx hirsute, calyx $\frac{1}{2}$–$\frac{3}{4}$ in. tubular scabrid or villous, teeth long slender patent or recurved, mouth wide naked or ciliate. *Wall. Cat.* 2046; *Dalz. & Gibs. Bomb. Fl.* 211.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7–9000 ft., *J. D. H.*; Bhotan, *Griffith.* KHASIA MTS., alt. 4–5000 ft.; *Wallich*, &c. DECCAN PENINSULA; on the Ghats, from the Concan to Travancore.

A tall annual? 1–3 ft., stem branched, obtusely 4-angled. *Leaves* membranous, narrowed at the base; petiole $\frac{1}{6}$–$\frac{3}{4}$ in. *Whorls* 1–$1\frac{1}{2}$ in. diam., crinite from the slender long bracts and calyx-teeth. *Calyx* very variable in size and hairiness, teeth flexuous, ciliate, in small forms more than half as long as the tube. *Corolla-tube* included. *Nutlets* $\frac{1}{10}$–$\frac{1}{8}$ in., oblong, smooth.

Sect. 4. **Plagiostoma.** *Bracts* usually as long as the calyx or nearly so. *Calyx* turbinate obconic or tubular, mouth very oblique, the

upper part projecting forwards, throat glabrous or nearly so, teeth erect (mouth straight in 28. *stricta*, 34. *diffusa*).

* *Annuals. Whorls terminal or axillary. Calyx-teeth long and slender.*

28. **L. stricta,** *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 614, and in *DC. Prodr.* xii. 531; annual, slender, erect, hispidly hairy, leaves oblong-lanceolate or linear, whorls solitary terminal, calyx ½ in. hispid between tubular and funnel-shaped nearly straight, teeth long very slender ciliate. *Wall. Cat.* 2045. Phlomis stricta, *Heyne mss.*

DECCAN PENINSULA; Pullicat Mts., *Heyne*; Sandstone Hills, N.E. of Belgaum, *Ritchie*, &c.; Bellary, *Beddome*.

Stem 6–10 in., branches acutely 4-gonous. *Leaves* ½–1½ in., obtuse, floral like the cauline, bracts filiform rigid ciliate. *Calyx* slightly hairy within; teeth sometimes nearly as long as the tube, much longer than the villi of the mouth. *Corolla-tube* included, upper lip very short, lower twice as large.

29. **L. Clarkei,** *Hook. f.*; annual? slender, sparsely appressedly pubescent, branches ascending scabrid, leaves linear or linear-lanceolate entire or subserrate, whorls terminal globose, calyx short ¼ in. pubescent turbinate subdecurved, teeth very slender, 3 upper much the longest, mouth laxly hairy.

BEHAR; on Parusnath, alt. 1500 ft., *Clarke*.

Branches 1–2 ft., up-curved, 4-gonous, hairs short deflexed. *Leaves* 1–2 in., obtuse, floral many, like the cauline. *Whorls* subglobose, ½–1 in. diam.; bracts very slender, ciliate, tips and of calyx-teeth acicular. *Calyx* broad; teeth rather squarrose, scabrid, longer than the villi of the mouth. *Corolla-tube* included, upper lip short, lower ⅓ in. long, widely spreading.

30. **L. nutans,** *Spreng. Syst.* ii. 743; annual, dwarf, diffusely branched, laxly hairy, leaves 1–2 in. shortly petioled oblong or linear-oblong obtuse subserrate, whorls terminal and axillary dense-fld., calyx ⅓ in. falcately decurved hispid deeply striate, teeth subequal lanceolate ciliate. *Benth. Lab.* 616, and in *DC. Prodr.* xii. 532. L. decurva, *Benth. in Wall. Pl. As. Rar.* i. 60, and *Cat.* 2050. Phlomis nutans, *Roth Nov. Sp.* 263.

N. and N.W. INDIA, from the upper Gangetic plain to the Indus. SCINDE; *Stocks*. The DECCAN; *Heyne*. BEHAR; on Parusnath, *Clarke*. BURMA; on the Irawaddi, *Wallich*.

A small often straggling species. *Leaves* sometimes petioled. *Whorls* conspicuous for the sharply decurved calyces, the teeth of which are less slender than in *L. Clarkei* or *martinicensis*. *Bracts* ciliate, very slender. *Calyx* membranous, teeth much longer than the hairs of the mouth. *Corolla* small.

31. **L. martinicensis,** *Br. Prodr.* 504; annual, tall, stout, scaberulous, leaves 3–4 in. petioled ovate or ovate-lanceolate obtuse coarsely crenate-serrate, whorls axillary globose, bracts and calyx-teeth spinescent ciliate, calyx ½–⅔ in. pubescent tubular sigmoidly curved, teeth slender, uppermost longest. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 617, and in *DC. Prodr.* xii. 533. L. polycephala, *Wall. Cat.* 2051.

Sporadic in INDIA, doubtfully indigenous. The DECCAN; from the Concan southwards, *Heyne*, &c. AVA; *Wallich*.—DISTRIB. Tropical Africa and America.

A stout herb, 2–4 ft.; branches 4-gonous, sometimes hispidly hairy. *Leaves* membranous, base cuneate; petiole ¼–½ in.; floral sessile, more lanceolate. *Whorls* numerous, ½–1 in. diam.; bracts slender, tips pale, often hooked. *Calyx* much

enlarged in fruit, teeth tipped like the bracts, ciliate, often recurved. *Corolla* small. *Nutlets* $\frac{1}{12}$ in., obovate-oblong, shining.

** *Annuals. Whorls terminal, rarely axillary. Calyx-teeth very short.*

32. **L. Cephalotes,** *Spreng. Syst.* ii. 743; annual, tall, stout, scaberulous, leaves 2–4 in. shortly petioled ovate or ovate-lanceolate subacute crenate-serrate, whorls very large terminal globose, bracts membranous elliptic- or linear-lanceolate awned, calyx $\frac{3}{4}$ in. tubular slightly curved, teeth short subulate scabrid, mouth hairy. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 616, and in *DC. Prodr.* xii. 532; *Wall. Cat.* 2043; *Wight Ic.* t. 337; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211; *Boiss. Fl. Orient.* iv. 779. L. capitata, *Desf. in Mem. Mus.* xi. 8, t. 4. Phlomis Cephalotes, *Roth Nov. Sp.* 262; *Roxb. Fl. Ind.* iii. 10.

HIMALAYA; from Simla to Bhotan, alt. 2–6000 ft. Plains from CHITTAGONG and ASSAM to the PANJAB, and south through the DECCAN (not in Ceylon).—DISTRIB. Affghanistan.

Stem 2–3 ft., hairs spreading. *Leaves* membranous, more or less pubescent. *Whorls* 1–2 in. diam., surrounded by the imbricating membranous appressed bracts, which are quite unlike those of any other species. *Calyx* usually softly pubescent, membranous; hairs of mouth as long as the teeth.

33. **L. zeylanica,** *Br. Prodr.* 504; annual, erect, pubescent or hispidly hairy, leaves 2–3 in. shortly petioled linear- or elliptic-lanceolate obtuse subserrate, whorls subterminal many-fld., bracts few ciliate, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. obliquely turbinate glabrous scabrid or sparsely hispid, teeth minute, mouth broad pubescent within. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 614, and in *DC. Prodr.* xii. 531; *Wight. Ill.* t. 176; *Thwaites Enum.* 240 (*excl. syn.*). L. involucrata, *Benth. in Wall. Cat.* 2047. Phlomis zeylanica, *Linn. Sp. Pl.* 820. Leonurus Marrubiastrum, *Burm. Fl. Ind.* 127, *non Linn.*

ASSAM; *Jenkins.* CACHAR and CHITTAGONG; *Clarke.* MALAY PENINSULA; from Rangoon, *Wallich,* to Singapore, *G. Thomson.* CEYLON, common.—DISTRIB. Malay Islands, China.

Stem 1–3 ft., branched above; hairs spreading, deflexed or appressed. *Leaves* sometimes 1 in. diam. *Whorls* small, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., rarely axillary; bracts fewer and shorter than in the allies, filiform, ciliate. *Calyx* very constant in size and shape, teeth erect or spreading horizontally.

VAR. *Walkeri*; branches long and strict, hairs appressed or spreading, leaves very narrow 2–3 by $\frac{1}{4}$–$\frac{1}{3}$ in. L. Walkeri, *Benth. in DC. Prodr.* xii. 531.—Ceylon, *Walker, Champion.*—Bentham regards this as near *L. hyssopifolia.* Without knowing whether it is annual or perennial, it is difficult to say whether it is a variety of that plant or of *L. zeylanica,* of which it has the tall habit and solitary terminal whorls.

34. **L. diffusa,** *Benth. Lab.* 615, and in *DC. Prodr.* xii. 531; annual, diffusely branched from the root, branches slender ascending hispid or hirsute, leaves $\frac{1}{2}$–1 in. linear or linear-oblong obtuse subentire, whorls chiefly solitary and terminal few-fld., calyx $\frac{1}{4}$ in. turbinate curved smooth below ribbed and hispid above, mouth wide truncate, teeth small subulate erect rather longer than the villi. Phlomis diffusa, *Herb. Rottler.*

DECCAN PENINSULA; *Heyne, Wight,* &c.

This differs from *L. zeylanica* in the diffuse habit and small leaves. It has been mixed in Wallich's Herbarium with *L. nutans* and *L. dimidiata,* Benth. (? of Sprengel), which is the same as *L. aspera.* From the latter the habit, almost entire leaves, smaller fewer-fld. whorls, and much shorter calyx with a wider truncate not oblique mouth abundantly distinguish it.

*** *Annual, except* L. hyssopifolia. *Whorls terminal and axillary. Calyx-teeth very short.*

35. **L. hyssopifolia,** *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 615, and in *DC. Prodr.* xii. 531; perennial, erect, hispidly hairy, leaves 1–2½ in. linear obtuse, margins recurved entire, whorls terminal and axillary small, bracts few subulate, calyx ¼ in. obconic glabrous, mouth wide truncate glabrous, teeth very minute erect. *Wall. Cat.* 2044.

SUBTROPICAL HIMALAYA and plains at their feet; from Jamu to Sikkim, alt. 1–3000 ft. CHOTA NAGPORE; at Sumbulpore, *Griffith.*

Rootstock stout, woody; branches numerous, 4–8 in. *Leaves* spreading, ⅛–¼ in. broad, often rigid. *Whorls* ½–¾ in. diam.; bracts very slender. *Calyx* very like *L. zeylanica* and *Wightii*; mouth glabrous within.

36. **L. Wightiana,** *Benth. in Wall. Pl. As. Rar.* i. 60; annual, erect, scabrid, leaves 1–2 in. linear obtuse entire, whorls small axillary and terminal or in dense terminal cylindric spikes, calyx ¼ in. obovoid hispid, mouth wide very oblique villous, teeth irregular triangular, upper longer. *Wall. Cat.* 2520. L. aspera, *var.* Wightiana, *Benth. Lab.* 616, and in *DC. Prodr.* xii. 532.

DECCAN PENINSULA; *Wight, G. Thomson.*

Stem 6–10 in., and *branches* very stout, and leaves grey; hairs minute, deflexed and appressed. *Leaves* ⅙–¼ in. broad, margins flat or recurved. *Whorls* ½–¾ in.; bracts slender, hispid. *Calyx* membranous below, green and striated above, not contracted at the junction. *Corolla* very small.—The stout scabrid habit, narrow entire leaves, small whorls, and short calyx, not contracted above the nutlets (with, however, similar teeth) distinguish this from *L. aspera.*

37. **L. aspera,** *Spreng. Syst.* ii. 743; annual, erect or diffuse, stem stout hispid or scabrid, leaves 1–3 in. linear or oblong obtuse entire or crenate, whorls large terminal and axillary, bracts long linear and filiform, calyx ⅓–⅔ in. tubular curved smooth below green and ribbed and scabrid above contracted above the nutlets, mouth small glabrous very oblique shortly irregularly toothed. *Benth. Lab.* 615, and in *DC. Prodr.* xii. 532; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211. L. Plukenetii, *Benth. in Wall. Pl. As. Rar.* i. 60 (? *Spreng.*); *Wall. Cat.* 2522. L. dimidiata, *Benth. in DC. l. c.* 532 (? *of Spreng.*). Phlomis aspera, *Willd. Enum. Hort. Berol.* ii. 621. P. Plukenetii, *Roth Nov. Sp.* 261. P. esculenta, *Roxb. Fl. Ind.* iii. 10. P. obliqua, *Ham. mss.*—*Rheede Hort. Mal.* x. t. 91.

PLAINS of INDIA; from Sikkim and Behar to the Panjab, and southward to Cape Comorin.—DISTRIB. Mauritius, Java, Philippine Islands.

Very variable. *Stem* erect, usually much diffusely branched from below, the branches 4–6 in., rather leafy, sometimes taller with erect branches and larger leaves ⅔ in. broad. *Whorls* often 1 in. diam., very dense-fld. and hispid. *Calyx* variable, but with always the upper lip produced and with short triangular teeth. *Corolla* small.—Whole plant fragrant and used as a pot-herb, *Roxb.* Bentham's *L. dimidiata,* from Burma (Wallich) is certainly *L. aspera,* and may or may not be Sprengel's plant of that name. A piece of *L. nutans* is on the same sheet.

38. **L. linifolia,** *Spreng. Syst.* ii. 743; annual, erect, smooth or scaberulous, leaves 2–4 in. linear or linear-lanceolate obtuse entire or subserrate, whorls axillary and terminal, bracts few short, calyx ¼–⅓ in. obovoid glabrous or puberulous, mouth very oblique contracted glabrous within, upper lip projecting acute 3-toothed, lower 2-fid. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 617, and in *DC. Prodr.* xii. 533; *Wall. Cat.* 2048; *Grah.*

Cat. Bomb. Pl. 153; *Dalz. & Gibs. Bomb. Fl.* 211. L. lavandulæfolia, *Sm. in Rees Cyclop.* Phlomis linifolia, *Roth Nov. Sp.* 260. P. zeylanica, *Roxb. Fl. Ind.* iii. 9; *Jacq. Ic. Pl. Rar.* i. 11, t. 111. Leonurus indicus, *Burm. Fl. Ind.* 127.—*Rumph. Herb. Amb.* vi. t. 16, f. 1.

PLAINS of INDIA; from Assam and Bengal and Silhet to Singapore. In the DECCAN; from the Concan to Travancore (not seen from the W. or N.W. Provinces of India, nor from Ceylon).—DISTRIB. Mauritius, Malay Islands.

Stem 2–3 ft., usually stout and much branched above. *Leaves* rarely ¾ in. broad; petiole 0–½ in. *Whorls* towards the ends of the branches, ½–¾ in. diam.; bracts setaceous. *Calyx* pale below, not striate above, toothing variable, sometimes spinescent.

VAR. *decipiens*; hispidly hairy, bracts very many ciliate, tips spinescent, calyx larger hirsute or pubescent, teeth longer spinous, uppermost pungent. L. aspera, *Pl. Ind. Or. Hohenack.* n. 1234.—South Deccan; Pycarrah, *Wight*; Nilghiris, *Hohenacker.*—Confounded with *L. aspera* in various collections, with which it agrees in hairiness.

DOUBTFUL SPECIES.

L. DIMIDIATA, *Spreng. Syst.* ii. 743; stem hairy, leaves oblong-lanceolate subserrate hirsute, whorls dimidiate, calyx oblong hairy above, teeth 10 subulate subpungent.—East Indies.—Probably *L. aspera,* to which belongs the specimen referred to this species by Bentham in his "Labiatarum Gen. & Sp.," and which is entirely different from *L. diffusa.*

46. **LEONOTIS,** *Br.*

Herbs or shrubs. *Whorls* axillary, densely many-fld.; bracteoles many, slender; flowers scarlet or yellow. *Calyx* 10-nerved, often incurved, mouth oblique; teeth 8–10, rigid, upper largest. *Corolla-tube* exserted; upper lip long, concave, crown villous; lower very small, spreading, concave, midlobe largest. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Disk* equal. *Style* subulate, upper lobe very short. *Nutlets* oblong or ovoid, triquetrous, obtuse or truncate, glabrous.—Species 12, African, one also Indian.

L. nepetæfolia, *Br. Prodr.* 504; herbaceous, leaves membranous ovate crenate, bracts spinescent, calyx ½–1 in., upper lip prominent rigid spinescent, lower with three erect or recurved spinescent teeth. *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 618, and in *DC. Prodr.* xii. 535; *Wall. Cat.* 2042; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211; *Wight Ill.* ii. t. 176 *bis,* f. 11, and *Ic.* t. 867; *Bot. Reg.* t. 281; *Bot. Mag.* t. 3700. Phlomis nepetæfolia, *Linn.*; *Roxb. Fl. Ind.* iii. 8. Leonurus globosus, *Moench Meth.* 400.

Throughout hotter India, from the Panjab to Travancore and Singapore, but not very common; cultivated and naturalized, doubtfully indigenous. CEYLON; in the drier parts.—DISTRIB. Tropical Asia, Africa and America.

A tall annual, 4–6 ft.; stem as thick as the finger, 4-angled with concave faces, puberulous. *Leaves* 4–8 by 2–5 in.; floral lanceolate, deflexed; petiole 1–3 in., winged above, slender. *Whorls* distant, globose, 2–3 in. diam., squarrose; bracts slender, linear, deflexed. *Calyx* ¾ in. long, ribbed and reticulate, pubescent or villous, tubular, incurved, teeth spinescent, upper ¼ in. long; throat glabrous. *Corolla* orange-red, 1 in. long; tube slender, exserted, villous like the upper lip, lower lip minute. *Nutlets* linear-oblong, widening upwards, truncate.

47. **PHLOMIS,** *Linn.*

Herbs or shrubs. *Whorls* axillary, dense-fld.; bracteoles many, ovate

lanceolate, or linear; flowers yellow, purple or white. *Calyx* 5- or 10-nerved, usually plicate, mouth equal truncate or 5-toothed. *Corolla-tube* usually annulate within; upper lip concave, crown villous (except *P. rugosa* & *breviflora*?), lower spreading, 3-fid. *Stamens* 4, ascending, posterior filaments often appendaged at the base; anthers conniving, cells divaricate. *Disk* equal. *Style* 2-fid, upper lobe shortest. *Nutlets* ovoid or obovoid, triquetrous, top glabrous.—Species about 45, Oriental and Temperate Asiatic.

* *Stem and branches terete.*

1. **P. spectabilis,** *Falc. mss.*; *Benth. in DC. Prodr.* xii. 542; tall, stout, hoary, leaves large broadly ovate-cordate crenate or sublobulate rugose stellately tomentose beneath, tip rounded, whorls many-fld., bracts filiform rigid hispid, calyx ½–¾ in. pubescent, teeth spiniform ⅓ shorter than the tube.

WESTERN HIMALAYA; Kashmir and Kishtwar, alt. 3–8000 ft., *Jacquemont, Falconer*, &c.—DISTRIB. Affghanistan.

Stem 4–6 ft., terete, as thick as the little finger, hoary or loosely stellately downy. *Leaves* sometimes a foot broad and not so long, nerves beneath softly hairy; floral small; petiole 6–12 in. *Whorls* 1½–2 in. diam.; bracts with acicular tips. *Corolla* rose-purple, galea beautifully fringed with silvery hairs. *Nutlets* ¼ in. long, linear. —P. oreophilla, *Karel. & Kiril.*, from Alatau, is probably a small state of this.

2. **P. cashmeriana,** *Royle Ill.* 303, t. 75 A; stout, erect, densely clothed with stellate white flocculent wool, leaves linear-oblong obtuse crenate rugose, base cordate, whorls many-fld., bracts filiform tomentose and ciliate, calyx ½–¾ in. plicate tomentose, teeth spiniform half the length of the tube. *Benth. in Hook. Bot. Misc.* iii. 382, *Lab.* 630, and in *DC. Prodr.* xii. 542; *Bot. Reg.* 1844, t. 22.

WESTERN HIMALAYA; Kashmir, alt. 5–6500 ft., *Royle, Thomson*, &c.—DISTRIB. Affghanistan.

Stems several from the very stout rootstock, 2–3 ft. high, terete. *Radical leaves* long-petioled, 5–9 by 2–4 in., coriaceous, finely pubescent above, nerves reticulate beneath; petiole 4–6 in. *Whorls* 1–1½ in. diam.; bracts numerous, ¾ in., tips acicular. *Corolla* pale purple; galea very large, tomentose, not fringed; lower lip very broad, adze-shaped. *Nutlets* broadly oblong, ⅓ in. long.

3. **P. Stewartii,** *Hook. f.*; densely stellately woolly, stem short stout woody branched, leaves shortly petioled linear-lanceolate subulate crenulate rugose above, base attenuate, whorls many-fld., bracts stout narrowly linear acute, calyx ½ in. densely woolly angled, teeth very short triangular recurved.

PANJAB; beyond the Indus, on the Suliman and Salt ranges, alt. 2500–4500 ft., *Stewart, Talbot.*

A low shrub, with spreading terete branches 6–10 in. long; wool flocculent, buff-coloured. *Leaves* 3–5 by ¼–¾ in., very leathery, scaberulous above. *Whorls* 1 in. diam.; bracts as long as the calyx, much thicker than in *P. cashmeriana.* *Corolla* small; galea tomentose, margin not fringed. *Nutlets* (ripe?) very small.

** *Stem and branches 4-angled.*

4. **P. macrophylla,** *Wall. Pl. As. Rar.* i. 62, and *Cat.* 2065; stem tall stout hirsute or glabrate, leaves long-petioled broadly ovate or oblong crenate, base broadly cordate, petiole almost as long as the blade, bracts equalling the calyx slender rigid ciliate, tips spinescent, calyx ½ in. sparsely

hairy, teeth spiniform $\frac{1}{4}$ the length of the tube. *Benth. Lab.* 631, and in *DC. Prodr.* xii. 543.

TEMPERATE HIMALAYA; Kumaon, alt. 10,000 ft., *Strachey & Winterbottom, Anderson*; Nepal, *Wallich*; Sikkim, alt. 10–13,000 ft., *J. D. H.*

Stem 5–6 ft., as thick as the little finger. *Leaves* 4–8 by 3–6 in., variable in breadth, base rarely cuneate, pubescent above and beneath; petiole stout. *Whorls* 1–1$\frac{1}{2}$ in. diam. *Corolla-tube* included, galea villous. *Nutlets* narrowly obcuneate, nearly $\frac{1}{4}$ in. long.

5. **P. breviflora,** *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 631, and in *DC. Prodr.* xii. 543; tall, erect, glabrous or slightly pubescent, leaves long-petioled broadly ovate deeply cordate acuminate crenate, whorls few-fld., bracts slender glabrous, calyx $\frac{1}{4}$–$\frac{1}{3}$ in. short nearly glabrous, teeth very short. P. parviflora, *Benth. in Wall. Cat.* 2066.

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 10–12,000 ft., *J. D. H.*, &c.

Perhaps only a variety of *P. macrophylla*, but the leaves are much more deeply cordate with rounded lobes, and the calyx is very small with minute teeth.

6. **P. setigera,** *Falcon. mss.*; *Benth. in DC. Prodr.* xii. 543; tall, erect, nearly glabrous or sparsely pubescent, leaves short-petioled ovate acuminate crenate, base rounded or cordate, whorls many-fld., bracts short rigid setaceous ciliate, tips spinescent, calyx $\frac{1}{3}$–$\frac{1}{2}$ in. hairy, teeth erect subulate ciliate $\frac{1}{3}$ the length of the tube.

TEMPERATE HIMALAYA; Kashmir, *Clarke*; Kumaon, *Falconer*; Sikkim, alt. 10–12,000 ft., *J. D. H.*, &c.

Habit of *P. macrophylla*, differing in the short $\frac{1}{2}$–1 in. petioles, the much shorter bracts, and the nutlets, which are $\frac{1}{6}$ in. long, obovoid, with a truncate top.

? VAR. *occidentalis, Clarke mss.*; bracts much longer and less rigid, calyx-teeth longer half the length of the tube.—Kashmir, Palgam, alt. 7000 ft., *Clarke.*

? VAR. *filiformis*; bracts soft filiform flexuous hirsute (not rigid nor spinous-tipped), nutlets $\frac{1}{12}$ in. long oblong.—Sikkim, Jongri and Tungu, alt. 1200–13,000 ft., *J. D. H.*—Of this subalpine plant the specimens are very poor; the bracts are very different from those of *P. setigera*, which, however, Clarke gathered at Jongri. It may be a form of *P. bracteosa.*

7. **P. bracteosa,** *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 383, *Lab.* 633, and in *DC. Prodr.* xii. 545; hoary pubescent or subtomentose, leaves petioled ovate obtuse crenate, base broadly cordate, whorls many- and dense-fld., bracts ciliate long, outer membranous lanceolate or linear tip not spinous, inner narrower, calyx $\frac{1}{3}$–$\frac{1}{2}$ in. hispid or glabrate, teeth slender ciliate. P. lamiifolia, latifolia, simplex *and* cordata, *Royle mss.*; *Benth. ll. c.*

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 5–11,000 ft. —DISTRIB. Affghanistan.

A tall stout herb, stem simple or branched, hairs stellate on the leaves, spreading or deflexed when present on the stem. *Leaves* 2–4 in. long, very variable in breadth and in the base, which is never deeply cordate and is sometimes truncate, tip usually rounded, rarely subacute, both surfaces tomentose or almost silky in Royle's *P. cordata*, finely tomentose in the ordinary form, much more glabrous in *P. lamiifolia*; petiole usually shorter than the blade. *Whorls* $\frac{3}{4}$–1 in. diam.; bracts usually equalling the calyx, erect. *Calyx-teeth* half the length of the tube or shorter. *Corolla* blue-purple; galea fringed with white hairs. *Nutlets* $\frac{1}{8}$–$\frac{1}{6}$ in., obovoid, tip rounded.

VAR. *longifolia*; leaves 6–8 in. ovate-lanceolate acuminate or acute sparsely pubescent.—Kashmir, Tragbol and Shapryon, alt. 7–8500 ft., *Clarke.*

8. **P. rugosa,** *Benth. in Wall. Pl. As. Rar.* i. 63, *Lab.* 634, and in

DC. Prodr. xii. 545; nearly glabrous, leaves long-petioled membranous elliptic or oblong-ovate acuminate minutely toothed, whorls small, bracts filiform, calyx $\frac{1}{3}$ in. obconic-campanulate glabrous or hispid, teeth very slender from a triangular base. *Wall. Cat.* 2067. Gomphostemma membranifolium, *Miquel Fl. Ind. Bat.* ii. 988.

SIKKIM HIMALAYA; Pomong, alt. 2–5000 ft., *J. D. H.*, *Clarke.* KHASIA MTS., alt. 5–6000 ft.; *Wallich*, &c. UPPER ASSAM; Mishmi Hills and Patkoye Mts., *Griffith.*—DISTRIB. Java, Philippines.

Stem tall, 2–3 ft., stout or slender, minutely hairy, hairs deflexed. *Leaves* 6–8 by 3–4 in., glabrous or with minute scattered hairs above, base acute or rounded; petiole 3–4 in., very slender. *Whorls* distant, often many below the leaves $\frac{1}{2}$–1 in. diam. *Calyx* coriaceous, teeth half the length of the tube. *Corolla* faintly pubescent, white or yellowish, upper lip narrow, lower with narrow side-lobes. *Nutlets* very large, $\frac{1}{4}$ in. long, obovoid, base acute, tip rounded.—An anomalous *Phlomis* with the calyx of *P. breviflora*, but very different leaves. The name *rugosa* is wholly inapplicable.

6348 9. **P. rotata,** *Benth. in Herb. Ind. Or. H. f. & T.*; stemless, leaves large rotately spreading orbicular or reniform coriaceous crenate rugose densely tomentose lacunosely reticulate beneath, whorls in a very short spike or subsessile head, bracts filiform, calyx sparsely hispid, teeth spinous.

ALPINE SIKKIM HIMALAYA; in the inner ranges, alt. 13–16,000 ft., *J. D. H.*

Annual? *Leaves* 3–6 in. diam., very thick, suddenly contracted into a very broad tomentose petiole $\frac{1}{2}$ in. broad; nerves very thick, flabellate; floral 0 or 2 oblong crenate. *Whorls* sometimes on a slender peduncle 2–3 in. long, at others forming a dense head $1\frac{1}{2}$ in. diam. or less in the centre of the leaves; bracts with acicular tips. *Calyx* $\frac{1}{3}$ in., funnel-shaped, rather membranous, teeth short. *Corolla* small, tube included, galea pubescent, densely fringed with white hairs.—A very remarkable plant, with the habit of *Lamium rhomboideum.*

48. NOTOCHÆTE, *Benth.*

An erect herb. *Leaves* long-petioled. *Whorls* axillary, globose, densely many-fld.; bracts slender, at length spinous with hooked lips. *Calyx* 5-nerved, membranous; teeth 5, equal, with long hook-tipped spines at the back. *Corolla* very small, tube included, not annulate; upper lip erect, concave; lower spreading, subequally trifid. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Style-lobes* minute, subequal. *Nutlets* narrow oblong, triquetrous, truncate, smooth.

N. hamosa, *Benth. in Wall. Pl. As. Rar.* i. 63, *Lab.* 636, and in *DC. Prodr.* xii. 547; *Wall. Cat.* 2068; *Hook. Ic. Pl.* t. 1217.

CENTRAL and EASTERN TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4–8000 ft., *J. D. H.*, &c.

Glabrous or pubescent. *Stem* creeping at the base, 2–4 ft., stout, 4-angled. *Leaves* 5–10 by 3–5 in., membranous, ovate, acuminate, toothed, base acute rounded or subcordate; petiole 2–3 in. *Whorls* 1–$1\frac{1}{2}$ in. diam., densely spiny, bracts longer than the calyx-tube. *Calyx-tube* $\frac{1}{3}$–$\frac{1}{2}$ in., slender, villous above the middle, fruiting hard 4-valved; spines at length $\frac{1}{4}$ in. *Corolla* as long as the calyx-spines, galea villous, lower lip as long subequally 3-lobed.

49. EREMOSTACHYS, *Bunge.*

Erect herbs. *Leaves*, radical broad, toothed or cut; cauline few, smaller. *Whorls* densely many-fld., axillary and in a terminal spike. *Calyx* subcam-

panulate or upper lip broad membranous; teeth 5, equal, setaceous. *Corolla-tube* included, upper lip erect, hooded, bearded within; lower spreading, 3-lobed, midlobe largest. *Stamens* 4, ascending, upper filaments fimbriate or appendaged at the base; anthers conniving, cells divaricate. *Disk* equal. *Style-lobes* equal or upper shorter. *Nutlets* obovoid, triquetrous, truncate, top densely hairy. Species 27, W. Asiatic.

1. **E. superba,** *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 381, *Lab.* 637, and in *DC. Prodr.* xii. 548; root-leaves pinnatisect, segments lobulate, the lower petioled, floral ovate acute, whorls many-fld. crowded in a very stout woolly spike, calyx subcampanulate, mouth truncate shortly broadly 5-lobed. *Royle Ill.* 303, t. 74.

WESTERN HIMALAYA; Gurwhal, on the Kheree Pass, *Royle*. WESTERN PANJAB; Peshawur, *Vicary*.

Stem 2 ft., strict, erect, unbranched, base ¾ in. diam., softly hairy. *Leaves*, radical ovate in outline, 8–12 in.; lobes or peduncles broad, obtuse; petiole hirsute; cauline few, small, sessile, pinnatifid. *Spike* 6–10 in.; floral leaves erect, concave, covering the flowers, deciduous. *Calyx* ¾ in., woolly. *Corolla-tube* included, galea ½ in., villous; lower lip broad, 3-lobed.

2. **E. Vicaryi,** *Benth in Aitch. Cat. Pl. Panjab & Scinde,* 119; root-leaves pinnatisect, segments sessile pinnatifid, lower floral sessile oblong lobulate, whorls many-fld., at length distant, calyx campanulate scurfily tomentose, mouth truncate shortly 5-crenate, crenatures apiculate.

WESTERN PANJAB; Peshawur, *Vicary*; Salt range, Jhelum, *Aitchison*.—DISTRIB. Beluchistan.

Stem 3–5 ft., very stout, simple or branched. *Leaves* radical, 12–18 in., ovate in outline, segments or pinnules sessile glabrous; petiole stout, base woolly. *Spikes* 8–10 in., rachis very stout. *Calyx* ½ in. *Corolla* smaller than in *E. superba*, galea villous and fringed with white hairs.

3. **E. acanthocalyx,** *Boiss. Diagn.* 2, iv. 49, and *Fl. Orient.* iv. 795; root-leaves pinnatisect, segments pinnatifid or lobulate, lower petioled, floral short broad, whorls many-fld., bracts linear-lanceolate spinescent, calyx campanulate stellately pubescent, teeth spinescent. E. laciniata, *Aitchison Cat. Pl. Panjab & Scinde,* 118 (*not of Bunge*).

WESTERN PANJAB; Peshawur, *Stewart*.—DISTRIB. Beluchistan, Affghanistan.

Stem 3–5 ft., very stout, simple or branched. *Leaves*, radical 6–12 in., oblong-ovate, hispid beneath; floral very broad, sessile, concave, as long as the flowers, deciduous; petiole and rachis hirsute. *Whorls* 1–2 in. diam., lower distant; bracts shorter than the calyx. *Calyx* ¾ in., mouth very shortly 5-lobed, lobes with a dorsal spreading spine ⅛ in. long. *Corolla* 1 in., tube exserted, galea pubescent, fringed with white hairs.

50. ERIOPHYTON, *Benth.*

A dwarf thickly woolly herb. *Leaves* rounded or rhomboid, toothed. *Whorls* 6-fld., axillary, crowded or the lower distant, flowers very large, yellow. *Calyx* campanulate, 10-nerved, membranous, 5-lobed to the middle, lobes finely acuminate. *Corolla-tube* included, upper lip very broad, galeate, compressed, arching over the lower, which is small with 3 rounded lobes. *Stamens* 4, posterior filaments thickened at the base; anthers conniving, villous, cells divaricate. *Disk* equal. *Style-arms* subequal. *Nutlets* large, irregularly broadly obovoid and triquetrous, truncate, glabrous.

E. Wallichianum, *Benth. in Wall. Pl. As. Rar.* i. 63 (*Wallichii*), *Lab.* 638, and in *DC. Prodr.* xii. 549; *Wall. Cat.* 2070.

ALPINE CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 15–17,000 ft., *J. D. H.*

Rootstock stout; stem 4–6 in., stout, simple, naked below; wool on leaves, bracts and calyx $\frac{1}{4}$ in. long, white, very soft, hardly silky. *Leaves* very close set, imbricating, spreading or deflexed, $1\frac{1}{2}$–2 in. diam., base broadly cuneate, nerves flabellate. *Bracts* 1–$1\frac{1}{2}$ in. broad, broadly cuneate, membranous, deeply toothed; bracteoles filiform. *Calyx* hidden amongst the leaves, 1 in. long; lobes triangular, finely pointed. *Corolla* $1\frac{1}{2}$ in., galea pubescent. *Nutlets* $\frac{1}{8}$ in. diam.—A very remarkable Labiate, which should be placed near Lamium, from which the broad galea and nutlets distinguish it.

51. GOMPHOSTEMMA, *Wall.*

Perennial, stellately pubescent or tomentose herbs; roots often with elongate tubers. *Whorls* 6–8-fld., dense- or lax-fld., axillary or in terminal spikes. *Calyx* 10-nerved, subequally 5-toothed. *Corolla-tube* slender; throat dilated, not annulate; upper lip galeate, lower broadly 3-fid. *Stamens* ascending; anthers conniving, cells parallel, transverse, naked. *Disk* symmetric or produced behind. *Style-lobes* subequal. *Nutlets* (drupes) various, glabrous or pubescent, hilum broad, pericarp thick corky or fleshy. *Cotyledons* often unequal.—Species 16, Indian, Malayan and Chinese.

* *Upper or all the whorls in terminal or axillary spikes.*

1. **G. strobilinum,** *Wall. Cat.* 2151; stem scurfily scabrid or tomentose, leaves elliptic-ovate subacute crenate scabrid above densely tomentose beneath, whorls in a dense stout terminal tomentose spike, bracts broadly elliptic-ovate exceeding the calyx, calyx $\frac{1}{2}$ in., lobes triangular acute. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 647, and in *DC. Prodr.* xii. 550.

BURMA; Prome, Rangoon, &c., *Wallich, M'Clelland.*—DISTRIB. Ava.

Leaves 4–10 by 2–6 in., narrowed into a petiole $\frac{1}{2}$–3 in. *Spike* sometimes 1 ft. and 2 in. broad; bracts 1 in. and under. *Calyx* $\frac{1}{4}$ in. *Corolla* twice as long. *Nutlets* $\frac{1}{6}$ in., turgid.

VAR. *viridis*; leaves more membranous narrowly elliptic-lanceolate finely pubescent beneath, flowers larger. G. viride, *Wall. Cat.* 2153; *Benth. ll. c.*—Tenasserim, *Wallich*; Moulmein, *Parish.*

VAR. *Heyneana*; stem petioles spikes and leaves beneath tomentose or densely woolly, "flowers blueish with a purple tinge," *Wight.* G. Heyneanum, *Wall. Cat.* 2152; *Benth. ll. c.*; *Wight Ill.* t. 176 *bis*, f. 9, and *Ic.* t. 1456.—Deccan, from the Bababoodan Hills to Travancore.

5645 2. **G. pedunculatum,** *Benth. mss.*; tomentose, leaves long-petioled 3–12 by $1\frac{1}{2}$–7 in., ovate or elliptic-ovate denticulate pubescent above, whorls crowded in short axillary peduncled oblong heads or spikes, bracts longer than the calyx ovate serrate, calyx $\frac{1}{3}$ in., lobes triangular acute.

KHASIA MTS.; below Nurtiung, *J. D. H. & T. T.*

Stem long, flexuous, prostrate, rooting below. *Leaves* distant. *Spikes* 1–4 in. long, axillary and from below the leaves or even from the rooting portion of the stem; peduncle tomentose, $\frac{1}{4}$–1 in.; bracts and calyx red-brown. *Corolla* $\frac{2}{3}$ in., glabrous, pale sulphur colour. *Nutlets* $\frac{1}{8}$ in., subglobose, rugose.

3. **G. acaule,** *Kurz mss.*; stemless, densely pubescent, leaves 4–8 by 3–$4\frac{1}{2}$ in. elliptic obtuse crenate, petiole very stout long or short, whorls in a very short velvety terminal sessile spike softly tomentose, bracts much longer than the calyx ovate crenate, calyx $\frac{3}{4}$ in., lobes lanceolate.

ARRACAN; on the Mingoo Hill, Boronga Island, *Kurz.*
Leaves spreading from the crown; petiole 1–3 in. *Spike* 2 in. long, 1 in. broad, leafy.

4. **G. nutans,** *Hook. f.*; stem very slender and leaves beneath and spikes softly densely tomentose, leaves 2–3½ in. subsessile ovate acute toothed pubescent above, whorls in a solitary short oblong terminal nodding or drooping spike, bracts longer than the calyx ovate subentire, calyx ⅝ in., lobes lanceolate.

KHASIA MTS., *Simons, Lobb*; Nunklow, alt. 3500 ft., *Clarke.*
Stem 12–18 in., erect, much more slender than in any other species. *Leaves* in distant pairs, base acute, petiole ⅛–¼ in. *Spike* 2 in. long, 1 in. broad. *Corolla* 1–1½ in. long. *Nutlets* rugose.

** *Whorls axillary.*

† *Stem stout.*

5. **G. oblongum,** *Wall. Cat.* 2154; stem-leaves beneath and whorls densely tomentose, leaves shortly petioled 6–10 by 2–3½ in. oblanceolate or acuminate crenate scabrid above, whorls sessile few-fld., bracts small, calyx ½ in. ribbed, teeth linear-lanceolate, corolla 1½ in. pubescent. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551.

TENASSERIM; Tavoy and Mergui, *Wallich*, &c.
Stem 2–3 ft., stout, erect. *Leaves* acute at the base; petiole ¼–1 in. *Bracts* variable, shorter than the calyx. *Corolla-tube* far exserted, very slender.
VAR. ? *Helferi*; leaves much broader 8–9 by 4½–5 in. obovate brown tomentose beneath, calyx ¾ in.—Tenasserim, *Helfer.*

6. **G. lucidum,** *Wall. Cat.* 2156; stem-leaves beneath and whorls densely brown woolly or tomentose, leaves short-petioled elliptic acute or oblanceolate acuminate subserrate scabrid above, whorls sessile few-fld., bracts small subulate, calyx ⅓ in. ribbed, teeth short triangular, corolla 1⅓ in. pubescent. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551.

KHASIA and JAINTEA MTS., alt. 4–5000 ft., common.
Stem very stout. *Leaves* shining above, base narrowed; petiole ¼–1 in. *Bracts* variable. *Calyx* cupular in fruit. *Corolla* as in *G. oblongum.* *Nutlets* ¼ in., oblong.

7. **G. niveum,** *Hook. f.*; stem and leaves beneath white-tomentose, leaves sessile or shortly petioled, oblanceolate acuminate serrate glabrous above, whorls sessile many-fld., bracts slender, calyx ⅓ in., teeth very slender as long as the tube.

EAST BENGAL; *Griffith.*
Stem erect, rather stout. *Leaves* much narrowed downwards either to the stem or into a very stout petiole. *Bracts* membranous, as long as the calyx. *Corolla* unexpanded, ½ in. *Nutlets* ⅙ in., oblong.

8. **G. parviflorum,** *Wall. Cat.* 2158; stem-leaves beneath and cymes densely softly tomentose, leaves shortly petioled 6–16 by 1–5 in. broadly or narrowly oblanceolate acuminate toothed, cymes peduncled many-fld., bracts slender or broad and leafy, calyx ⅓ in., teeth very slender as long as the tube, corolla 1 in. glabrate. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551. G. multiflorum, *Benth. ll. c.*

TROPICAL HIMALAYA; from Nepal to Mishmi, alt. 0–4000 ft. ASSAM, KHASIA MTS., CHITTAGONG and TENASSERIM. PENANG, *Wallich.*

Stem very stout. *Leaves* narrowed into a stout petiole 1-2 in. long. *Cymes* laxly fascicled; peduncle ½–1½ in.; flowers often pedicelled; bracts longer than the calyx, from linear to ovate-lanceolate. *Corolla* very slender, ochreous, throat and limb small. *Nutlets* usually solitary, ellipsoid, rugose.

9. **G. crinitum,** *Wall. Cat.* 2159; stem and leaves beneath finely tomentose, leaves petioled 8–12 by 2½–4½ in. elliptic and decurrent on the petiole or oblanceolate subacute entire or toothed, whorls sessile many- and dense-fld., bracts exceeding the calyx long linear, calyx ½ in., teeth capillary exceeding the terete tube. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 552.

TENASSERIM; Tavoy, *Wallich.* MALACCA, Mount Ophir and Cheboo Forest, *Griffith.*

Stem stout. *Leaves* in Wallich's specimen broad, toothed, suddenly narrowed into a wing, in Griffith's narrow subentire and narrowed into a stout petiole. *Whorls* in Wallich's glabrate, in Griffith's pubescent or villous. *Corolla* ¾ in., lemon-coloured, tube very slender, limb subglobose.

10. **G. Thomsoni,** *Benth. in Herb. Ind. Or. Hook. f. & T.*; stem woody, and leaves beneath pubescent or tomentose, leaves long-petioled 6–12 by 2½–8 in. membranous oblong or orbicular ovate acute crenulate pubescent above, whorls in dense crowded masses in the lower axils and on the stem below then sessile very many-fld., bracts as long as the calyx linear and lanceolate, calyx ½ in., tube narrow, teeth subulate as long as the tube, corolla slender, limb small glabrous.

KHASIA MTS.; Churra, alt. 3–5000 ft., *J. D. H. & T. T.*

Stem as thick as the little finger, hoary; wood hard. *Leaves* the largest of the genus, very variable in breadth. *Whorls* in globose or irregular clusters 1 in. long and broad, subcrinite from the slender tips of the bracts and the calyx-teeth. *Calyx* small in flower, tube in fruit oblong. *Corolla* glabrous, pale yellow, tube extremely slender, throat hardly inflated; upper lip narrow, lower small. *Nutlets* ⅙ in., oblong, rugose.

11. **G. eriocarpum,** *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 649, and in *DC. Prodr.* xii. 552; stem rather slender tomentose, leaves 3–5 in. shortly petioled elliptic-oblong or lanceolate acute toothed glabrous above softly tomentose beneath, nerves reticulate, whorls small sessile few-fld., bracts broad and narrow, calyx ⅓ in., teeth filiform as long as the tube, corolla slender, limb small puberulous, nutlets globose tomentose. *Wall. Cat.* 2710. G. oblongum, *Wight Ic.* t. 1457.

SOUTHERN DECCAN; Courtallum, *Wight,* &c.; Anamallays and Tinnevelly Hills, *Beddome.*

Stem 2–3 ft., leafy. *Leaves* narrowed into the petiole of 1–2 in. *Whorls* ½–¾ in. diam., subcrinite. *Calyx-tube* cupular in fruit, with one globose nutlet ⅛ in. diam. clothed with grey pubescence.

†† *Stem very short, or slender prostrate, rooting at the base and ascending above.*

12. **G. melissæfolium,** *Wall. Cat.* 2157; puberulous or glabrate, stem slender prostrate, leaves petioled 2–3½ in. elliptic acute faintly toothed, whorls 2–5 fld., calyx ¼ in. puberulous, teeth lanceolate, corolla very large. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 649, and in *DC. Prodr.* xii. 552. Prasium melissifolium, *Roxb. Fl. Ind.* iii. 26.

SIKKIM HIMALAYA, alt. 2000 ft.; *J. D. H.* ASSAM, SILHET and CACHAR, *Wallich,* &c.

Stem 2–3 ft., flexuous, rooting for half its length. *Leaves* membranous, sometimes sparsely hairy above, nerves beneath puberulous, base acute; petiole ½–1 in. *Bracts* ovate or lanceolate. *Corolla* 1½ in. long, pubescent; throat inflated, ½ in. diam. *Nutlets* scarlet.

13. **G. velutinum,** *Benth. in Wall. Pl. As. Rar.* ii. 13, *Lab.* 649, and in *DC. Prodr.* xii. 552; densely velvety-tomentose, stem prostrate rooting below, leaves 1½–2 in. thick petioled elliptic subacute crenate, whorls few-fld., bracts equalling the calyx slender, calyx ⅓ in. villous, teeth lanceolate. *Wall. Cat.* 2709.

ASSAM, SILHET and KHASIA MTS., ascending to 4000 ft.; *Wallich*, &c.

Stem flexuous or tortuous. *Leaves* the smallest of the Indian species, equally velvety on both surfaces; base cuneate; petiole ½–1 in. *Corolla* 1 in., tube rather short; throat long, moderately inflated.

14. **G. ovatum,** *Wall. Cat.* 2155; stem short suberect, petioles whorls and leaves beneath softly tomentose, leaves 4–6 in. long-petioled broadly elliptic obtuse crenate puberulous above, whorls few-fld., bracts longer than the calyx ovate leafy, calyx ⅓ in., teeth narrowly lanceolate, corolla 1¼ in., tube and throat long.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3–4000 ft., *J. D. H.*

Stem ascending or suberect, not creeping, 10–12 in. *Leaves* membranous, base cuneate; petiole 1–3 in. *Bracts* as in *G. strobilinum*. *Corolla* pale yellow, pubescent, tube gradually dilating into the funnel-shaped throat.

15. **G. Mastersii,** *Benth. in Herb. Ind. Or. H.f. & T.*; stem short ascending and leaves beneath and whorls pubescent or tomentose, leaves petioled 4–8 in. broadly (rarely narrowly) elliptic ovate obtuse toothed or crenate pubescent or setose or subsilky above, whorls few-fld., bracts equalling the calyx lanceolate with filiform points, outer sometimes ovate, calyx ½–¾ in., teeth lanceolate, points very slender, corolla 2 in., tube long. G. melissæfolium, *Wall. Cat.* 2157, *in part*.

SIKKIM HIMALAYA, alt. 3000 ft.; *J. D. H.* ASSAM, KHASIA MTS., ascending to 4000 ft., SILHET and CACHAR; *Wallich*, &c.

A very variable plant, possibly not distinct from *G. ovatum*. *Root-tubers* fusiform, ½–1 in. long. *Leaves* in some specimens with long spreading hairs on the upper surface, in others with deep irregular crenatures, in others with a rounded or even cordate base; petiole 1–2½ in. *Whorls* occasionally shortly peduncled (as in *G. pedunculatum*). *Corolla* pubescent, ochreous, yellow, tube gradually dilating into the throat.

52. LEUCOSCEPTRUM, *Smith.*

A tomentose or villous shrub or small tree. *Leaves* large. *Whorls* in dense cylindric terminal spikes, bracts large, transversely oblong caducous. *Calyx* campanulate decurved, teeth rounded. *Corolla* minute, 5-lobed; lobes rounded, upper largest. *Stamens* very far exserted, filaments very long, straight in flower, diverging, pubescent below; anthers reniform, 1-celled, very short. *Style-arms* minute, subulate. *Nutlets* elongate-cuneate, triquetrous.

L. canum, *Sm. Exot. Bot.* ii. 113, t. 116; *Benth. in Wall. Pl. As. Rar.* i. 58; *Wall. Cat.* 2023. Teucrium macrostachyum, *Wall. in Benth. Lab.* 664; *Benth. in DC. Prodr.* xii. 574; *Gamble Ind. Timbers,* 302, and *List of Trees, &c., of Darjeeling,* 62. Clerodendron Leucosceptrum, *Don Prodr.* 103. Buddleia, *Griff. Notul.* iv. 125; *Itin. Notes,* 107 (n. 94 *a*),

and *Ic. Pl. Asiat.* t. 422. Colquhounia sp., *Clarke in Journ. Linn. Soc. Bot.* xv. 145.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 2–8000 ft. KHASIA MTS., alt. 4–5000 ft.

Tree, 30 ft., trunk short. *Branches* nearly terete, very stout, and as well as the leaves beneath petioles and spikes densely or laxly tomentose or woolly, rarely glabrate. *Leaves* 6–12 by 2½–4½ in., elliptic-lanceolate, acuminate, entire or crenate, glabrous above, beneath with silvery-white or buff or brown tomentum most variable in thickness, rarely green and glabrate; petiole 1–1½ in. *Spikes* 4–6 in., ¾ in. diam. (without the stamens); bracts ⅓ in. broad, subreniform, hoary or tomentose, imbricating and covering the buds when very young, early caducous. *Calyx* ⅙ in., hoary, sessile or pedicelled. *Corolla* white or pinkish, hoary without. *Stamens* ½–⅔ in., filaments diverging, at length deflexed, stout, yellow; anthers minute.—This seems to me as distinct a genus as any in the Order; the stamens are very characteristic, spreading as in *Satureineæ*, with the anther-cells parallel, not divergent, and the filaments involute in bud.

53. **TEUCRIUM,** *Linn.*

Herbs or shrubs. *Whorls* in 2–6-fld. axillary or terminal spikes racemes or heads. *Calyx* 10-nerved, teeth 5, equal or the upper larger. *Corolla-tube* not annulate, limb 1-lipped, the 2 upper and lateral lobes cuneate and very short or obsolete, lower lobe very large. *Stamens* 4, exserted; anther reniform, cells short, at length confluent. *Disk* symmetrical. *Style-lobes* subequal. *Nutlets* minute, reticulate, smooth or rugulose; hilum large, oblique or lateral.—Species about 100, chiefly temperate and S. European.

Sect. 1. **Scorodonia.** *Whorls* 2-fld., secund, in terminal racemes. *Calyx* campanulate, declinate, upper tooth largest.

1. **T. tomentosum,** *Heyne in Wall. Cat.* 2025; pubescent tomentose or woolly, leaves ovate serrate toothed or crenate, base cuneate, racemes panicled, calyx ¼ in. villous, lower teeth triangular acuminate. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 674, and in *DC. Prodr.* xii. 582; *Thwaites Enum.* 241. T. paniculatum, *Herb. Madr. in Wall. Cat. sub.* 2025.

DECCAN PENINSULA; on the Ghats from the Concan southward, *Heyne*, &c. CEYLON, alt. 5–7000 ft.; *Walker*, &c.

An erect copiously flowering herb, 2–3 ft. high. *Leaves* 2–3 in., base rarely rounded or cordate; petiole ½–1½ in., slender. *Bracts* lanceolate, usually longer than the pedicels. *Corolla-tube* included, limb small. *Nutlets* minute, globose, granulate.

2. **T. stoloniferum,** *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 3; stoloniferous, glabrous or puberulous, leaves ovate or oblong-ovate subacute deeply crenate or obtusely serrate, base truncate or cuneate, racemes simple or panicled, calyx ⅛ in. glandular-pubescent, lower teeth short obtuse. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 674, and in *DC. Prodr.* xii. 583; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 825. T. elevatum, *Benth. in Wall. Cat.* 2026. T. viscidum, *Blume Bijd.* 827.

SIKKIM HIMALAYA, alt. 1–5000 ft.; *J. D. H.* BENGAL PLAINS, KHASIA MTS., ascending to 4000 ft., and CHITTAGONG.—DISTRIB. Ava, Java, China.

An erect herb, 1–2 ft., stem sometimes woody below. *Leaves* 1–3 in., base rarely cordate. *Racemes* slender; bracts lanceolate, fruiting pedicels usually longer than the shortly campanulate calyx. *Corolla* pink, tube included, limb very small. *Nutlets* enclosed in the globose calyx-tube, nearly smooth.

3. **T. Royleanum,** *Wall. Cat.* 2027; stoloniferous, pubescent, tomen-

tose or villous, leaves petioled ovate or oblong-ovate cordate acute serrate, racemes short, calyx $\frac{1}{6}$ in. villous, upper tooth rounded acute, 2 lower lanceolate acuminate, lateral shorter, corolla-lobe exserted. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 675, and in *DC. Prodr.* xii. 583.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 3–5000 ft., *Royle*, &c.—DISTRIB. Affghanistan.

Stem prostrate and rooting below, then erect, 12–18 in., rather slender. *Leaves* $1\frac{1}{2}$–3 in.; petiole $\frac{1}{2}$–1 in., slender. *Racemes* subsimple, 1–3 in., rarely more; bracts lanceolate, longer than the pedicels. *Calyx* campanulate, upper and 2 lower teeth usually incurved. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., tube sometimes twice the length of the calyx. *Nutlets* enclosed in the globose calyx-teeth, subrugose.

4. **T. laxum,** *Don Prodr.* 109; stem slender diffusely branched laxly villous or glabrate, leaves petioled ovate acuminate serrate, racemes short often recurved, calyx $\frac{1}{4}$ in. pubescent, upper lip rounded acute, 2 lower lanceolate acute, corolla-tube included. *Benth. Lab.* 675, and in *DC. Prodr.* xii. 583. Ajuga laxa, *Ham. mss.*

CENTRAL HIMALAYA; Nepal, *Hamilton*; Kumaon, *Edgeworth*, alt. 8000 ft.; Ramgunga River, alt. 4500 ft., *Strachey & Winterbottom* (Hedeoma n. 2).

Stems or *branches* 10–12 in., rather slender, villous with long sparse spreading hairs in Edgeworth's specimen, glabrous in Strachey's. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., base rounded, petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 1–2 in.; bracts ovate-lanceolate, shorter than the calyx. *Corolla* not twice the length of the calyx.—Don's character hardly agrees with the specimens above described in the ventricose calyx.

5. **T. quadrifarium,** *Ham. in Don Prodr.* 108; stout, erect, tomentose or villous, rarely glabrate, leaves sessile or short-petioled ovate or oblong-ovate cordate acute serrate racemes panicled, bracts ovate acute much exceeding the flowers, calyx $\frac{1}{6}$ in., upper lip rounded, 2 lower acute or obtuse, corolla-tube included. *Wall. Cat.* 2024; *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 675, and in *DC. Prodr.* xii. 583; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 827. T. Fortunei, *Benth. in DC. l. c.* (excl. Perrottet's plant).

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–8000 ft. KHASIA MTS., alt. 4–5500 ft.—DISTRIB. Ava, China.

A stout herb, stem 2–4 ft., almost terete below, sometimes villous with long spreading hairs. *Leaves* 2–3 in., often rugose; petiole usually $\frac{1}{4}$ in., rarely 1 in. *Spikes* 2–6 in., stout, with the bracts on $\frac{3}{4}$ in. diam.; bracts $\frac{1}{4}$ in., broadly ovate, suddenly acuminate, villous near the base, young quadrifarious imbricating and concealing the flowers, often red-purple; flowers sessile or very shortly pedicelled. *Corolla* purple, not twice the length of the calyx. *Style* entire. *Nutlets* subglobose, rugose.

6. **T. Wightii,** *Hook. f.*; very robust, densely villous, leaves short-petioled very thick rugose rounded ovate obtuse toothed, racemes panicled, bracts shorter than the calyx elliptic acute, calyx $\frac{1}{4}$ in. villous, upper tooth rounded apiculate, 2 lower lanceolate, corolla-tube included. T. quadrifarium, *Herb. Wight* (*Kew Distrib.* 2168). T. tomentosum, *Wight Ic.* t. 1458. T. n. sp., *Benth. Pl. Hohenack.* n. 1396.

NILGHIRI HILLS; in dry rocky places, alt. 7000 ft., *Wight*, &c.

Stem 1–2 ft., obtusely angled; hairs tawny, most dense, spreading. *Leaves* 1–$1\frac{1}{4}$ in.; petiole stout, $\frac{1}{4}$ in. *Racemes* 3–4 in. *Corolla* purple, $\frac{1}{4}$ in. long. *Style* entire or 2-toothed. *Nutlets* subglobose, glistening, faintly reticulate.—Wight represents the leaves acute, which is the case in *T. tomentosum*, but never in this.

5606 7. **T. palmatum,** *Benth. in Herb. Ind. Or. H. f. & T.*; nearly glabrous, slender, stoloniferous, leaves long-petioled 3-foliolate leaflets rhomboid-ovate acuminate coarsely serrate, racemes short puberulous few-fld., calyx $\frac{1}{4}$ in., upper lip of 3 triangular acuminate teeth, corolla-tube included, upper lip oblong.

SIKKIM HIMALAYA; Lachen, alt. 9–10,000 ft., *J. D. H.*

Stem 1–2 ft., weak, erect, puberulous above. *Leaves* membranous, leaflets 2–3 by 1–1$\frac{1}{2}$ in., base cuneate; petiole 1$\frac{1}{2}$–3 in. *Racemes* 1–2 in.; bracts subulate, equalling or shorter than the pedicel. *Corolla* $\frac{1}{2}$ in., upper lip half as long as the lower, concave, obtusely 2-fid, lateral lobes of lower broad, midlobe longest retuse. *Fruiting calyx* membranous reticulate, lips broad gaping. *Nutlets* $\frac{1}{12}$ in. diam., globose, faintly reticulate.

Sect. 2. **Scordium.** *Whorls* 2–6-fld., axillary.

8. **T. Scordium,** *Linn.*; perennial, tomentose or glabrate, leafy, leaves small sessile oblong obtuse coarsely toothed. *Benth. in DC. Prodr.* xii. 586; *Boiss. Fl. Orient.* iv. 812; *Reichb. Ic. Fl. Germ.* t. 1239.

WESTERN HIMALAYA; Kashmir, *Jacquemont.*—DISTRIB. Affghanistan, N. & W. Asia, Europe, N. Africa.

Stoloniferous, fœtid and glandular. *Leaves* uniform, $\frac{1}{2}$–1$\frac{1}{2}$ in., base cuneate. *Flowers* pedicelled. *Calyx* $\frac{1}{8}$ in., shortly campanulate, base gibbous, teeth triangular subequal. *Corolla* $\frac{1}{3}$ in., rose-purple. *Nutlets* oblong, rugose.

54. **AJUGA,** *Linn.*

Annual or perennial herbs. *Whorls* 2- or more-fld., axillary or in terminal leafy spikes. *Calyx* 10- or more-nerved; teeth 5, subequal. *Corolla-tube* often annulate within, upper lip very short, 2-fid; lower spreading, midlobe usually the largest notched or 2-fid. *Stamens* 4, ascending, exserted or included; anther-cells diverging, distinct or at length confluent. *Disk* symmetric or produced behind. *Ovary* shortly 4-lobed; style-lobes subequal. *Nutlets* obovoid, rugose, hilum lateral.—Species 30, of the temperate Old World.

* *Corolla-tube straight, base not inflated. Stamens exserted.*

1. **A. lobata,** *Don Prodr.* 108; softly hairy or glabrate, stems very long and slender prostrate or creeping, leaves long-petioled orbicular or broadly oblong cordate sinuate-lobed, whorls axillary or in short erect axillary spikes. *Wall. Cat.* 2034; *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 692, and in *DC. Prodr.* xii. 595.

CENTRAL and EASTERN HIMALAYA, alt. 8–10,000 ft.; from Nepal, *Wallich,* to Bhotan, *Griffith.* KHASIA MTS., alt. 5–6000 ft.; *J. D. H. & T. T.*, &c.

Stems 1–2 ft., flexuous. *Leaves* distant, 1–2 in. long and broad; petiole as long or longer. *Spike* 1–3 in.; bracts ovate-oblong, toothed; lower whorls distant, 2-fld., upper 6-fld. *Calyx* $\frac{1}{4}$ in.; teeth long, lanceolate. *Corolla* lilac; tube thrice as long as the calyx, slender, laxly pubescent; upper lip very short; lower very large, side lobes linear-oblong, midlobe broadly dilated retuse.

2. **A. bracteosa,** *Wall. Cat.* 2032; softly pubescent villous or glabrate, rarely substrigose or hispid, stolons 0, stems or branches erect or ascending, leaves oblanceolate or subspathulate obtuse sinuate-toothed, whorls axillary or crowded in spikes much shorter than the leafy ovate or cuneate-obovate entire or toothed bracts, calyx-teeth ovate-lanceolate, corolla-tube exserted,

stamens exserted. *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 696, and in *DC. Prodr.* xii. 598; *Maximov. in Bull. Acad. Sc. Petersb., Mel. Biol.* xi. 818. A. remota, *Benth. ll. c.*; *Maximov. l. c.* 817.

WESTERN HIMALAYA, from Kashmir to Nepal, alt. 1–7000 ft., and in the plains near them from Oudh to Peshawur.—DISTRIB. Affghanistan, China, Japan, Abyssinia.

Stem or *branches* many from the rootstock, 4–12 in., simple or divided, usually stout, leafy, pubescence most variable. *Leaves* 1–4 in., lower petioled, upper sessile. *Calyx* $\frac{1}{6}$ in., villous; teeth half the length of the tube, ovate-lanceolate, acute. *Corolla* pale blue or lilac, pubescent; tube rarely twice as long as the calyx; upper lip erect, 2-fid; side lobes of lower oblong, midlobe dilated variable in length. *Nutlets* $\frac{1}{10}$ in., ellipsoid, deeply rugosely pitted.—I am quite unable to distinguish Bentham's *A. remota*, which was probably intended to include the form with distant whorls and large floral leaves. Nor can I distinguish a common Japanese plant from *A. bracteosa.*

VAR. *densiflora*; stem scapiform, radical leaves obovate-oblong obtuse subentire, cauline 0 or oblong sessile, spike 2–3 in. villous, bracts shorter than the flowers, corolla very shortly exserted. A. densiflora, *Wall. Cat.* 2031; *Benth. ll. c.*—Nepal, *Wallich.*—This looks like a starved *A. bracteosa*, which the form of the calyx, corolla and nutlets entirely resemble.

** *Corolla-tube straight. Stamens included in the tube.*

3. **A. parviflora,** *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 696, and in *DC. Prodr.* xii. 598; softly villous, stems or branches short diffuse ascending, stolons 0, radical leaves sessile or shortly petioled oblanceolate or obovate-spathulate obtuse entire or crenate, whorls in bracteate spikes, calyx-teeth lanceolate, corolla very small, tube exserted. *Maxim. in Bull. Acad. Sc. Petersb., Mel. Biol.* xi. 825; *Wawra Itin. Pr. S. Cob., Bot.* 105. Teucrium hispidum, *Wall. Cat.* 2029 (*corrected p.* 89).

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 2–7000 ft.—DISTRIB. Affghanistan.

Branches very numerous from the woody rootstock, stout or slender, leafy. *Radical leaves* 2–3 (rarely 5 by 2) in.; cauline smaller, obovate or oblong. *Spike* 1–4 in., whorls generally crowded, lower sometimes distant; bracts ovate or oblong, much longer than the flowers. *Calyx* $\frac{1}{10}$–$\frac{1}{8}$ in., teeth as long as the tube. *Corolla* blue, tube slender, $\frac{1}{8}$–$\frac{1}{6}$ in. long, glabrous or hairy; limb very small, upper lip very short 2-lobed, lateral lobes of lower subequal or the midlobe the largest. *Nutlets* $\frac{1}{18}$ in., rugosely pitted.—Very variable in habit and size of leaves.

VAR. *depressa*; densely villous, branches depressed. A. depressa, *Maxim. l. c.* 826.—This is a stunted alpine state from an elevation of 8000 ft. in Kumaon. (*Strachey & Winterbottom*, Ajuga, n. 5.)

4. **A. brachystemon,** *Maximov. in Bull. Acad. Imp. Sc. Petersb.* xi. 825; dwarf, villous, stem very short ascending leafy, radical leaves petioled obovate obtuse crenate, cauline sessile, whorls in very short subsessile leafy spikes, shorter than the ovate bracts, calyx-teeth very short rounded, corolla-tube shortly exserted.

WESTERN HIMALAYA; Kumaon, Pindari, alt. 12,500 ft., *Strachey & Winterbottom* (Ajuga, n. 4).

Stem 1–2 in. from a small woody rootstock. *Leaves* 1–1½ in., radical shortly petioled, crenulate, cauline shorter. *Spike* ½ in. *Calyx* obconic, $\frac{1}{10}$ in. long, teeth ciliate. *Corolla* $\frac{1}{6}$ in., tube straight, upper lip short, 2-lobed; side-lobes of lower linear-oblong, obtuse; midlobe twice as broad, dilated, retuse. *Stamens* wholly included.—This looks like a starved state of something, but I cannot refer it to any described species; the calyx resembles *A. macrosperma* in miniature, but the corolla-tube is straight with included stamens.

*** *Corolla inflated at the base, geniculate above the swelling. Stamens exserted.*

5. **A. macrosperma,** *Wall. Cat.* 2030; glabrous pubescent or villous, stem or branches decumbent or ascending often stout and tall, leaves petioled ovate-oblong or obovate obtuse sinuate-crenate, whorls villous continuous or interrupted longer than the ovate bracts, calyx-teeth very short obtuse. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 697, and in *DC. Prodr.* xii. 599; *Maxim. in Bull. Acad. Imp. Sc. Petersb., Mel. Biol.* xi. 823. A. repens, *Roxb. Fl. Ind.* iii. 3. A. geniculata, *Maxim. l. c.* 821.

TROPICAL and TEMPERATE HIMALAYA, from Kumaon to Bhotan, alt. 1–8000 ft. KHASIA MTS., alt. 1–5000 ft. CHITTAGONG, PEGU.—DISTRIB. Ava.

Very variable; stems or branches 6 in. to 3 ft., sometimes as thick as a swan's quill, spreading and branching, sometimes rooting, and glabrous or densely pubescent or villous. *Leaves* 1–6 in. long, very variable in breadth, narrowed into the often very long petiole, rarely lobed or cut. *Spikes* 1–8 in., whorls continuous or interrupted, lower bracts leaf-like. *Calyx* short, teeth always obtuse. *Corolla* azure, tube twice as long as the calyx, usually glabrous, limb small; upper lip erect, 2-lobed; lobes of lower subequal or midlobe broadest. *Nutlets* $\frac{1}{12}$–$\frac{1}{20}$ in. long, deeply rugosely pitted.—A very common species in the hilly countries of N. India, being the largest of the genus; in the low grounds forming a bushy herb sometimes 3 feet high, with widely spreading decumbent branches and abundant spikes of blue flowers. In the higher elevations it assumes a lower and more slender form *with smaller leaves* (*A. sikkimensis*, Miq.), with the corolla laxly hairy and its tube scarcely exserted. This form has sometimes stems only a few inches high and irregularly toothed leaves. Whether *A. macrosperma*, and any of its states, be the *A. decumbens*, Thunb., of Japan, as would follow from Don's and Bentham's references, is unknown to me, as I have seen no Japanese Ajuga with a geniculate corolla-tube. According to Maximovicz's description of *A. decumbens*, it must differ in the deeper sharper calyx-lobes, the more prominent midlobe of the corolla, and in the minutely reticulate nutlets.

5666 — VAR. *Thomsoni*; glabrous, stems slender flaccid rooting prostrate, spikes with a very slender rachis, calyx-teeth very short rounded, corolla glabrous, tube exserted. A. Thomsoni, *Maxim. l. c.* 821.—Sikkim, alt. 6–9000 ft., *J. D. H. & T. T.*—This is certainly only an upland state of *A. macrosperma*. However unlike the extreme low-land form, it is united by intermediates collected near to it at lower elevations.

VAR. *breviflora*; smaller, branches more slender than the type 4 in.–2 ft., corolla-tube shorter sometimes quite included often hairy. A. decumbens, *Don Prodr.* 108; *Benth. in DC. l. c.* 598 (*? of Thunberg*). A. sikkimensis, *Miq. Prolus. Fl. Jap.* 46; *Maxim. l. c.* 822.—Higher parts of the Khasia Mts., ascending to 10,000 ft. in Sikkim. Behar; top of Parusnath, *J. D. H.*—Perhaps all the Himalayan forms of *A. macrosperma* should be referred to this, but I can find no definite characters for them.

UNKNOWN SPECIES.

A. ? OVATA, *Wall. Cat.* 2036, from Ava, is indeterminable, having no flower or fruit.

55. **CYMARIA,** *Benth.*

Shrubs. *Flowers* small, in lax many-fld. axillary peduncled cymes, ebracteate or crowded in a terminal thyrse. *Calyx* erect, 10-nerved, 5-toothed, fruiting-tube globose, throat naked. *Corolla-tube* straight; lips subequal, upper arched, erect; lower spreading, 3-fid, midlobe largest. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Disk* symmetric. *Ovary* shortly 4-lobed; upper style-lobe very short. *Nutlets* subglobose or obovoid, rugosely pitted; hilum lateral.—Species 3, Burman and Malayan.

1. **C. dichotoma,** *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 705, and in *DC. Prodr.* xii. 603; branches petioles cymes and leaves beneath finely pubescent, leaves ovate or rhomboid subacute faintly crenate, cymes axillary long-peduncled lax-fld. *Wall. Cat.* 2080.

BURMA; at Taong-dong, *Wallich.*

Stem terete, woody; branches strict, slender, obtusely 4-angled. *Leaves* 3–4 by 1½–2 in., membranous, base cuneate; petiole ¼–½ in. *Peduncle* ½–2 in., slender. *Calyx* ⅛ in., teeth triangular acute, as long as the tube. *Corolla* minute, tube hardly exserted. *Stamens* included. *Nutlets* $\frac{1}{38}$ in.

2. **C. elongata,** *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 705, and in *DC. Prodr.* xii. 603; branches petioles leaves beneath and cymes densely tomentose, leaves subsessile ovate obtuse subcrenate, cymes short-peduncled dense-fld. in a long terminal leafy raceme. *Wall. Cat.* 2079.

BURMA; at Taong-dong, *Wallich.*

Branches long, robust. *Leaves* 1½–3 in., thick, finely tomentose above. *Peduncle* ¼–½ in., and pedicels stout. *Calyx* ⅛ in., as in *C. dichotoma,* but tomentose. *Nutlets* $\frac{1}{24}$ in., obovoid.

ORDER CXIII. PLANTAGINEÆ.

Scapigerous herbs. *Leaves* usually radical. *Scapes* axillary. *Flowers* small, greenish, spicate, often dimorphic. *Sepals* 4, imbricate in bud, persistent. *Corolla* hypogynous, salver-shaped, scarious; lobes 4, imbricate in bud. *Stamens* 4, inserted on the corolla-tube; filaments capillary, inflexed in bud, persistent; anthers large, pendulous, versatile. *Ovary* free, 2–4-celled; style filiform with 2 lines of stigmatic hairs; ovules 1 basal in each cell, or several peltately attached to the septum. *Capsule* 1–4-celled, circumsciss, membranous, 1- or more-seeded, septum free. *Seed* usually peltate, testa thin, mucilaginous, albumen fleshy; embryo cylindric, transverse, radicle inferior.—Genera 3, species about 50.—The above character does not include the anomalous monotypic genera *Littorella* and *Bougueria.*

Plantago, *Linn.*

Characters of the Order.

Sect. 1. **Euplantago,** *Boiss.* Leaves all radical.

* *Corolla glabrous. Capsule 2-celled, cells 4–8-seeded. Seeds angular.*

1. **P. major,** *Linn.*; perennial, leaves petioled oblong or oblong-ovate subentire or toothed 3–7-ribbed, scape short, spike very long and slender. *Boiss. Fl. Orient.* iv. 878; *Dcne. in DC. Prodr.* xii. 1, 696; *Thwaites Enum.* 245. P. erosa, *Wall. in Roxb. Fl. Ind., Ed. Carey & Wall.* i. 423, and *Cat.* 6412; *Don Prodr.* 77; *Dcne. l. c.* P. asiatica, *Linn. Sp. Pl.* 163; *Dcne. l. c.* 695; *Wight Ill.* t. 177. P. longiscapa, *Jacquem. mss.*

TEMPERATE and ALPINE HIMALAYA; from Peshawur and Kashmir to Bhotan, alt. 2–8000 ft., and WESTERN TIBET, alt. 10–12,000 ft. ASSAM, *Griffith.* KHASIA MTS., alt 4–5000 ft. BURMA and MALACCA, *Griffith.* SINGAPORE or PENANG, *Walker.* BOMBAY, *Stocks.* NILGHIRI HILLS, *Foulkes,* &c. CEYLON; higher parts of the island, *Walker,* &c.—DISTRIB. Malay Islands; Affghanistan and westwards to the Atlantic; wild or introduced, in these and many other countries.

Glabrous or hairy; rootstock stout, truncate. *Leaves* 2–5 in., variable in breadth, toothing irregular; petiole sometimes 4 in. *Spike* 3–6 in.; flowers scattered or crowded; bracts equalling the calyx. *Sepals* glabrous, ⅛ in. long, margins broadly scarious, obtusely keeled. *Filaments* short. *Seeds* very minute, black.

** *Corolla glabrous. Capsule* 2-*celled, cells* 1–2-*seeded.*

2. **P. lanceolata,** *Linn.*; perennial, leaves shortly petioled lanceolate entire or toothed 3–5-ribbed, axils woolly, scape long deeply furrowed, spike very short. *Boiss. Fl. Orient.* iv. 881; *Don Prodr.* 77; *Thwaites Enum.* 245; *Dcne. in DC. Prodr.* xiii. 1, 714. P. attenuata, *Wall. in Roxb. Fl. Ind., Ed. Carey & Wall.* i. 422, and *Cat.* 6413.

WESTERN HIMALAYA; from Kashmir to Simla, *Royle, Thomson,* &c. Salt range, *Aitchison.* Waziristan, alt. 5–8000 ft., *Stewart.* (NEPAL and CEYLON introduced.)—DISTRIB. Europe and N. Asia; introduced into many countries.

Very variable in size. *Rootstock* tapering. *Leaves* 1–12 in. *Scape* as long or longer. *Spike* ½–3 in., ovoid, subglobose or cylindric; bracts acuminate. *Sepals* usually ciliate. *Filaments* long. *Seeds* oblong, concavo-convex, black.

3. **P. tibetica,** *Herb. Ind. Or. Hook. f. & T.*; perennial, glabrous or nearly so, leaves sessile or petioled elliptic or elliptic-lanceolate entire or toothed 5-ribbed, axils glabrous, scape grooved, spike slender.

WESTERN HIMALAYA; Kashmir, alt. 4–11,000 ft., *Stewart.* WESTERN TIBET; common, alt. 10–13,000 ft., *Thomson, Henderson.*

Rootstock short, stout. *Leaves* 2–4 in., variable in width, subacute. *Scapes* glabrous or puberulous. *Spikes* 1–6 in.; flowers very pale; bracts oblong, obtuse, equalling the calyx. *Sepals* broadly oblong, scarious, midrib green. *Corolla* very small, lobes acute. *Capsule* twice as long as the calyx, very pale.—Some specimens of apparently first year's plants from wet places have oblong membranous leaves 4 in. long or petioles as long, and very slender scapes and spikes.

4. **P. brachyphylla,** *Edgew. mss.*; *Dcne. in DC. Prodr.* xiii. 1, 696; perennial, glabrous, leaves elliptic-ovate subsessile or petioled 3–5-ribbed, axils glabrous, scapes stout glabrous longer than the leaves and cylindric spikes. P. gentianoides, *Dcne. l. c.* 721 (the Himalayan plant).

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 9–13,000 ft., *Edgeworth,* &c. WESTERN TIBET, alt. 11–14,000 ft.; *Thomson.*—DISTRIB. Affghanistan.

Much resembling a small state of *P. major*, but the seeds are 1–2 in each cell, oblong and plano-convex.

5. **P. Stocksii,** *Boiss. in DC. Prodr.* xiii. 1, 720, and *Fl. Orient.* iv. 882; annual or perennial, cobwebby or subsilky, leaves shortly petioled lanceolate long-acuminate entire 3-nerved, scape slender longer than the leaves, spike short and few-fld. or long with many distant flowers, corolla-lobes acute. P. remotiflora, *Stocks in Hook. Kew Journ. Bot.* iv. 179.

N.W. INDIA; Waziristan, alt. 3–5000 ft., *Stewart.*—DISTRIB. Affghanistan and Beluchistan, Persia.

Root fusiform. *Leaves* 2–4 in. *Spikes* sometimes 5 in. long, at others only ½ in.; bracts rather shorter than the calyx, obtuse, hairy or glabrate, margin membranous, back green. *Sepals* subsimilar, ovate-oblong, obtuse. *Seeds* large, narrowly oblong, boat-shaped, black.—Waziristan is just beyond the British frontier, but as the species will probably occur on this side of it, I have thought it right to introduce the description.

6. **P. amplexicaulis,** *Cav. Ic.* ii. 22, t. 125; annual or perennial, stemless or subcaulescent, sparsely hairy or glabrate, leaves long very narrowly lanceolate finely acuminate 5-nerved, base sheathing, scapes axillary terete equalling or exceeding the leaves, spikes ovoid, corolla-lobes ovate acute. *Boiss. Fl. Orient.* iv. 883; *Dcne. in DC. Prodr.* xiii. 1, 719. P. Bauphula, *Edgew. in Hook. Journ. Bot.* ii. 285 (1840); *Dcne. l. c.* P. salina, *Dcne. l. c.* 720. P. lagopoides, *Desf. Fl. Atlant.* i. 135, t. 39.

PANJAB PLAINS; from the Sutlej westwards, *Falconer*, &c. MALWA, *Edgeworth*. SCINDE; on the Boogta Hills, *Vicary*.—DISTRIB. Westwards to Greece and Egypt.

Stem 0, or branched from the base, and 2–4 in. high, bearing leaves and axillary scapes. *Leaves* 3–6 in., rarely 2 in. diam.; margin entire or very sparingly toothed. *Scapes* very numerous, stout, glabrous. *Spikes* ½–1½ in.; flowers large; bracts cupular, glabrous, membranous except the green midrib. *Sepals* rounded, outer with a green keel, inner all membranous. *Seeds* ⅙ in., boat-shaped, brown; septum ⅙–¼ in. long, oblong, thickened, black.

7. **P. ovata,** *Forsk. Fl. Æg. Arab.* 31; annual, stemless or subcaulescent, sparsely or thickly villous, leaves narrow-linear or filiform finely acuminate, scapes longer or shorter than the leaves, spikes ovoid or cylindric, corolla-lobes rounded concave obtuse. *Boiss. Fl. Orient.* iv. 885; *Dcne. in DC. Prodr.* xiii. 1, 706. P. decumbens, *Forsk. l. c.*; *Dcne. l. c.* P. Ispaghul, *Roxb. Fl. Ind.* i. 404, and *Ed. Carey & Wall.* i. 421; *Fleming in As. Research.* xi. 174; *Royle Ill.* 312; *Dcne. l. c.* (Ispaghula); *Bentl. & Trim. Med. Bot.* t. 211. P. argentea, *Desf. Fl. Atlant.* ii. 136. P. lanata, *Wall. Cat.* 6414.

PANJAB PLAINS and low HILLS; from the Sutlej westwards. SCINDE, *Stocks*.—DISTRIB. Westwards to Spain and the Canaries.

Stem rarely branched, as in *P. amplexicaulis*. *Leaves* 3–9 in., rarely ¼ in. diam., usually 3-nerved, entire or distantly toothed. *Scapes* glabrous or pubescent. *Spikes* ½–1½ in.; bracts with broad scarious margins, ovate-oblong, obtuse, glabrous. *Sepals* subsimilar, glabrous or pubescent. *Seeds* cymbiform.

*** *Corolla-lobes hirsute. Capsule 2-celled, cells 1-seeded.*

8. **P. ciliata,** *Desf. Fl. Atlant.* i. 137, t. 39; annual or perennial, stemless or subcaulescent, densely silky or woolly, leaves long- or short-petioled oblanceolate acuminate, scapes stout longer or shorter than the leaves, spikes oblong or cylindric, bracts sepals and acuminate corolla-lobes villous. *Dcne. in DC. Prodr.* xiii. 1, 708; *Boiss. Fl. Orient.* iv. 887. P. eriantha, *Dcne. l. c.* 707.

The PANJAB HILLS, west of the Jhelum; Salt range, *Fleming*; Peshawur, *Vicary*, &c.—DISTRIB. Westwards to Arabia and Egypt.

Usually a dwarf species, with broadly oblanceolate apiculate leaves 1–4 in. long, but sometimes caulescent with narrow leaves 6 in. long. *Scapes* numerous. *Spikes* stout, 1–2 in.; bracts ovate, obtuse, broadly membranous, back green. *Sepals* membranous. *Seeds* boat-shaped.

Sect. 2. **Psyllium.** *Stem* leafy. *Leaves* opposite.

9. **P. Psyllium,** *Linn.*; annual, erect, strict, glandular-pubescent, leaves linear or linear-lanceolate flat obtuse, peduncles in the upper axils, spikes ovoid, bracts acute, lower elongate. *Boiss. Fl. Orient.* iv. 891; *Dcne. in DC. Prodr.* xiii. 1, 734; *Sibth. Fl. Græc.* t. 149; *Reichb. Ic. Fl. Germ.* t. 84. P. arenaria, *Dcne. l. c.* 735 (the Indian plant).

NORTH-WESTERN PANJAB; Peshawur and South of Brumoo, *Stewart*; Tarki, N. of Indus, alt. 2800 ft., *Aitchison*.—DISTRIB. Westwards to Greece and Egypt.

Stem 4–8 in. *Leaves* 1–1½ in., with fascicles in their axils, hence appearing whorled, margin entire with a very few glandular tubercles, bases ciliate. *Scapes* usually shorter than the leaves. *Spikes* ⅓–½ in.; lower bracts sometimes spreading, hispid. *Sepals* oblong, subacute. *Corolla* very small.

10. **P. pumila,** *Willd. Enum. Hort. Berol.* i. 162; stem ascending

flexuous glabrous or puberulous, leaves filiform, margins revolute, peduncles in the upper axils, spikes ovoid or subglobose puberulous, bracts all longer than the calyx, lower equalling the spike, corolla lobes finely acuminate. *Dcne. in DC. Prodr.* xiii. 1, 735; *Boiss. Fl. Orient.* iv. 891. Plantago, *Griff. It. Notes,* 214, n. 84, and *Notulæ,* iv. 213; and *Ic. Pl. Asiat.* t. 462.

NORTH-WEST INDIA; *Royle* (raised from seed bought in Bazaar).—DISTRIB. Affghanistan, Egypt.

This is, I think, a form of *P. Psyllium,* or of *P. stricta,* Schousb. Royle's only specimen is very small, 6 in. high and slender, but Griffith's from Affghanistan is a foot high with a very robust stem.—Boissier doubtfully refers *P. indica,* L., to this.

ORDER CXIV. **NYCTAGINEÆ.**

Herbs, shrubs or trees. *Leaves* usually opposite, quite entire, exstipulate. *Inflorescence* various, flowers often involucrate. *Perianth* petaloid, monopetalous; tube persistent, enveloping the fruit; limb 3–5-lobed, plaited in bud. *Stamens* 8–30, hypogynous, sometimes unilateral, filaments usually unequal, inflexed in bud; anthers didymous. *Ovary* free, 1-celled; style involute in bud, stigma simple or multifid; ovule 1, erect. *Fruit* membranous, enclosed in the hardened perianth-tube. *Seed* erect, testa adherent, albumen floury or soft; embryo curved, coiled or with folded cotyledons, radicle inferior.—Genera 23, species 215, chiefly tropical American.

TRIBE I. **Mirabilieæ.** *Embryo* hooked, radicle long.

Flowers involucrate . . . . 1. OXYBAPHUS.
Flowers not involucrate . . . . 2. BOERHAAVIA.

TRIBE II. **Pisonieæ.** *Embryo* straight, radicle short.
3. PISONIA.

1. **OXYBAPHUS,** *Vahl.*

Herbs. *Leaves* opposite. *Involucre* 1–5-fld. *Perianth-tube* short, limb deciduous. *Stamens* 2–5, filaments connate below. *Fruit* small.—Species about 20, all but the following American.

O. himalaicus, *Edgew. in Trans. Linn. Soc.* xx. 87; glandular-pubescent, viscid, leaves petioled ovate or ovate-cordate, flowers solitary in each involucre. *Chois. in DC. Prodr.* xiii. 2, 430.

WESTERN HIMALAYA; from Kulu to Gurwhal, alt. 6–9000 ft., *Edgeworth,* &c.

Stem 2–4 ft., branched, terete, brittle. *Leaves* 2–3 by 1½–2½ in., acute, ciliolate; petiole ½–1 in. *Flowers* panicled, involucre ¼ in., campanulate, 5-toothed, viscid. *Perianth* included, rosy, contracted above the ovary, limb spreading. *Stamens* 4, included. *Fruit* ⅓ in. long, ellipsoid or ovoid, rough, black.

2. **BOERHAAVIA,** *Linn.*

Herbs. *Leaves* opposite. *Flowers* minute or small, panicled umbelled or capitate, jointed on the pedicel; bracteoles small, rarely forming a minute involucre. *Perianth-tube* long or short; limb funnel-shaped, 5-lobed. *Stamens* 1–5, exserted. *Ovary* oblique, stipitate, stigma peltate. *Fruit* small, glandular. *Cotyledons* broad, thin, enclosing a soft scanty albumen.—Species 30, tropical and subtropical.

* *Flowers capitate.*

1. **B. repens,** *Linn.*; diffusely branched, leaves linear ovate oblong or rounded obtuse or acute, base rounded or cordate, heads small in terminal or axillary panicles, flowers minute capitate, fruit ⅛ in. long shortly clavate 5-ribbed viscid all over, top rounded. *Boiss. Fl. Orient.* iv. 1045; *Dalz. & Gibs. Bomb. Fl.* 213.

Throughout INDIA; from the Panjab to Assam and south to Travancore and Singapore; ascends in the hot Himalayan valleys to 7000 ft. CEYLON.—DISTRIB. Tropical and subtropical Asia, Africa and America.

Root fusiform, very stout; rootstock woody; branches 6–24 in., glabrous or pubescent. *Leaves* ½–2 in., thick, usually white beneath; petiole as long as the blade or shorter. *Panicle* with very slender branches. *Perianth* red. *Stamens* 2–3.— I have refrained from quoting any but Indian authorities for this plant, the whole genus appearing to me to be in a state of utter confusion. *B. ascendens,* Willd.; *hirsuta,* Willd., and *viscosa,* Lag., are probably the same as this. I am further unable to draw any line between the following forms, two of which are characterized by Boissier.

B. repens proper; small, branches 6–10 in. not very stout appressedly pubescent, leaves small ovate or oblong often acute rarely cordate green above white beneath.— B. repens, *Delile Fl. Eg.* t. 3, f. 1.

VAR. *procumbens*; branches 2–3 ft. usually slender glabrous, leaves larger broader often rounded white beneath, inflorescence panicled. B. procumbens, *Herb. Banks in Roxb. Fl. Ind.* i. 146; *Wight Ic.* t. 874; *Grah. Cat. Bomb. Pl.* 167.

VAR. *diffusa*; more robust, branches long stout glabrous pubescent or viscous, leaves 1–2 in. ovate obtuse or acute usually cordate green beneath, inflorescence chiefly axillary. B. diffusa, *Linn. Sp. Pl.* 3; *Wall. Cat.* 6770; *Boiss. l. c.* 1045. B. repanda, *Wall. Cat.* 6769, *in part.*—*Rheede Hort. Mal.* vii. t. 56.

2. **B. crispa,** *Heyne in Wall. Cat.* 6771; stout, erect, scaberulously pubescent, stem subsimple, leaves shortly petioled oblong or ovate-oblong rounded at both ends coriaceous scabrid on both surfaces, nerves very numerous and strong beneath, flowers few capitate in a laxly branched panicle with capillary peduncles, fruit ⅙ in. long clavate 5-ribbed glandular, top rounded. B. rugosa, *Rottler mss.*

DECCAN PENINSULA; *Heyne.*

A robust species. *Leaves* 1–1½ in., very thick and hard, margin crisped; petiole stout, ⅛–¼ in. *Panicles* with decurved branches.—The specimens of this very distinct-looking plant are in fruit only.

** *Flowers umbelled or whorled.*

3. **B. repanda,** *Willd. Sp. Pl.* i. 22; subscandent, branches long pale, leaves triangular-ovate or -cordate acute or acuminate repand-sinuate, umbels long-peduncled axillary and terminal few-fld., pedicels long slender, fruit ¼ in. long slender glandular. *Chois. in DC. Prodr.* xiii. 1, 455; *Wall. Cat.* 6769, *excl. part of B*; *Wight Ic.* t. 1766; *Dalz. & Gibs. Bomb. Fl.* 213. B. umbellata, *Wight mss.* Valeriana chinensis, *Burm. Fl. Ind.* 15, t. 6, f. 3.

UPPER GANGETIC PLAIN and ROHILKUND, *Wallich, Edgeworth,* &c. The CONCAN, *Stocks.* MYSORE, TRAVANCORE and the CARNATIC, *Wight,* &c. PEGU and BURMA, *Wallich.*—DISTRIB. Beluchistan.

Branches diffuse, subscandent, glabrous or pubescent, 6 ft. long. *Leaves* 1–3 in., base usually truncate or cordate; petiole slender, ½–1½ in. *Peduncles* 1–2 in., very slender, 2–6 fld.; pedicels ¼–1 in., capillary. *Perianth* pink, tube ¼ in. long; limb ⅛ in. diam. *Stamens* far exserted. *Fruit* slightly clavate, covered with large glands,

obscurely ribbed.—This closely resembles the American *B. scandens,* but the flower is much larger and the stamens are far exserted.

4. **B. verticillata,** *Poir. Dict.* v. 56; branches long pale, leaves broadly ovate or rounded rarely oblong obtuse sinuate, umbels long-peduncled axillary and panicled few-fld. often superposed, pedicels long slender, fruit $\frac{1}{6}$ in. clavate with large semi-globose glands round the crown. *Chois. in DC. Prodr.* xiii. 1, 454; *Wall. Cat.* 6772; *Boiss. Fl. Orient.* iv. 1044. B. stellata, *Wight Ic.* t. 875; *Chois. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 213. B. scandens, *Gibs. Cat. Bomb. Pl.* 167; *Wall. Cat.* 6773.

WESTERN PANJAB; Salt range, Mt. Tilla, *Aitchison.* The CONCAN, KATTYWAR and SCINDE, *Dalzell, Stocks,* &c. GOOJERAT, *Gibson.* MYSORE, at Hyderabad, *Heyne.* TRAVANCORE and the CARNATIC, *Wight.*—DISTRIB. Affghanistan, Beluchistan, and westward to Syria and Tropical Africa.

Habit, foliage and inflorescence much as in *B. repanda,* but leaves usually obtuse; flowers smaller, white or pink, and fruit very different.

5. **B. fruticosa,** *Dalz. in Dalz. & Gibs. Bomb. Fl.* 213; "erect, shrubby, viscidly tomentose, leaves ovate or triangular acuminate much wrinkled beneath, base truncate, peduncles axillary, pedicels slender, flowers umbelled small pink, fruit linear-oblong sulcate pubescent, ribs tubercled."

The CONCAN; Ghats east of Bombay and Sewnere forts, *Dalzell.*

Stem 2 in. diam.; branches very stout. *Leaves* 1–2 in.; petiole short, stout. *Peduncles* as long as the leaves, stout; umbels sometimes superposed; pedicels stout, $\frac{1}{4}$–$\frac{1}{3}$ in. *Perianth* $\frac{1}{3}$ in. diam. *Fruit* not seen.—Probably an African species. It resembles *B. grandiflora,* A. Rich, a good deal.

*** *Flowers in di-tri-chotomous cymes; pedicels very long, capillary.*

6. **B. elegans,** *Chois. in DC. Prodr.* xiii. 2, 453; shrubby below, branches erect, leaves sessile linear oblong or oblong-lanceolate obtuse or apiculate fleshy pruinose, flowers in a very large excessively di-tri-chotomously branched panicle with very long capillary peduncles and pedicels, fruit $\frac{1}{10}$ in. long narrowly ellipsoid or clavate strongly ribbed perfectly smooth. *Boiss. Fl. Orient.* iv. 1045.

The PANJAB; at Sandal bar, *Edgeworth.* SCINDE, *Stocks.*—DISTRIB. Beluchistan, S. Arabia.

Stock woody, much divided; branches erect, 1–2 ft., glaucous below. *Leaves* few, 1–1½ in., curiously mottled with white when dry. *Peduncles* or branches of panicle divaricate; pedicels 1–2 in.; bracts (if present) setaceous. *Flowers* minute. *Fruit* narrowed at both ends, minutely hairy between the ribs.—Schimper's No. 744 from Arabia, which Steudel has named *B. rubicunda,* and which is referred here by Choisy and Boissier, is perhaps a different species, having broader petioled leaves (of the same texture however) and fruit twice as large; it is No. 159 of Fischer's, and No. 98 of Schwenfurth's Arabian collections.—Seeds eaten, *Edgew.*

3. PISONIA, *Linn.*

Trees or shrubs, sometimes spinous. *Leaves* opposite or alternate. *Flowers* in corymbose cymes, not involucrate. *Flowers* usually diœcious, 2–3-bracteolate. *Perianth* 5–10-toothed, of male flower funnel-shaped, of female tubular. *Stamens* 6–10, exserted. *Ovary* sessile, oblique; stigma capitate or feathery. *Fruit* large or small. *Cotyledons* crumpled, enclosing a scanty soft albumen.—Species 60, all tropical, one only African.

1. **P. aculeata,** *Linn.*; a tall woody climber with axillary recurved prickles, cymes dense-fld., fruit narrowly oblong or clavate 5-ribbed, ribs muricate with several rows of glands. *Chois. in DC. Prodr.* xiii. 1, 440; *Lamk. Ill.* t. 861; *Gaertn. Fruct.* i. t. 76; *Roxb. Fl. Ind.* ii. 217; *Wight Ic.* t. 1763-4; *Grah. Cat. Bomb. Pl.* 167; *Kurz For. Fl.* ii. 279; *Bedd. Sylv. Madr.* 175, t. 22, f. 3. P. Georgina, *Wall. Cat.* 6768. P. villosa, *Poir. Dict.* v. 347; *Chois. l. c.* Tragularia horrida, *Koen. mss.*

SOUTH CONCAN, and elsewhere in the DECCAN PENINSULA, *Heyne*, &c. CEYLON, *Walker*, &c. BURMA, *Wallich.*—DISTRIB. Tropical Asia, Africa, Australia and America.

Trunk very short; branches subopposite, horizontal. *Leaves* 2–3 in., elliptic, obtuse, entire, base cuneate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* in dense axillary and terminal corymbose cymes, greenish-white. *Male* flower $\frac{1}{1}$ in. long, campanulate, pedicelled, 5-toothed. *Stamens* 7–8. *Female* flower ovoid, obscurely toothed; stigma lacerate. *Fruit* long-pedicelled, $\frac{1}{3}$–$\frac{2}{3}$ in.

2. **P. alba,** *Spanoghe in Linnæa*, 1841, 342; unarmed, arboreous, leaves large, fruit narrow club-shaped 5-angled, angles with one row of prickles. *Kurz For. Fl.* ii. 279; *Wight Ic.* t. 1765; *Miq. Fl. Ind. Bat.* i. 1, 990; *Chois. in DC. Prodr.* xiii. 2, 446. ? P. inermis, *Forst. Prodr.* 397. P. morindæfolia, *Br. in Wall. Cat.* 7130; *Chois. l. c.* 447. ? P. malabarica, *Poir. Encycl. Suppl.* ? P. mitis, *Linn. Sp. Pl.* 1511; *Burm. Fl. Ind.* 224 (*excl. citation of Rheede*).

ANDAMAN ISLANDS; beach forests rare, *Kurz*; cultivated in India and Ceylon. —DISTRIB. Malay Islands.

A tree, 30–40 ft., glabrous except the inflorescence; branches stout. *Leaves* 6–10 in., oblong-ovate or oblong, acute or acuminate; petiole $\frac{1}{2}$–$1\frac{1}{3}$ in. *Flowers* in dense corymbose terminal cymes. *Male* flower $\frac{1}{4}$ in. long, tubular-campanulate, pedicelled, 5-toothed; stamens 8. *Female* flower much smaller; stigma penicellate. *Fruit* $\frac{1}{2}$–$\frac{3}{4}$ in. long, long-pedicelled.—It is very doubtful what name this should bear; it may probably be identified with *P. inermis*, Forst., of the Pacific Islands.

3. **P. excelsa,** *Blume Bijd.* 735; unarmed, arboreous, leaves large petioled opposite alternate or 3-nately whorled, fruit elongate linear truncate 5-angled, angles smooth viscid. *Chois. in DC. Prodr.* xiii. 2, 441; *Hassk. Pl. Jav. Rar.* 227; *Spanoghe in Linnæa*, 1841, 342; *Miquel Fl. Ind. Bat.* i. 1, 990. P. umbellifera, *Seem. ex Kurz For. Fl.* ii. 280. P. macrocarpa, *Presl Symb.* t. 56.

ANDAMAN ISLANDS; forests along the coast, *Kurz.*—DISTRIB. Malay Islands.

A tree, 30–50 ft., glabrous except the puberulous shoots. *Leaves* $1\frac{1}{2}$–1 ft. glossy; petiole $\frac{1}{2}$–1 in. *Flowers* small, cymose or umbellate; peduncles sparingly tomentose or glabrescent. *Perianth* nearly glabrous. *Fruit* $1\frac{1}{2}$ in. or less, glabrous.—Kurz has referred this to Seemann's *P. umbellifera*, which Bentham affirms (Fl. Austral. v. 281) to be Blume's *P. excelsa*. I have seen only leaf and fruit, the rest of the above description being from Kurz.

EXCLUDED SPECIES.—P. racemosa, *Wall. Cat.* 7296, is *Petunga longifolia*, DC. (See v. iii. 120).

ORDER CXV. ILLECEBRACEÆ.

Herbs, usually small and tufted. *Leaves* opposite or alternate; stipules scarious. *Flowers* cymose, minute. *Sepals* 4–5, persistent, closing over the fruit. *Petals* minute or 0. *Stamens* hypogynous or perigynous; filaments short; anthers didymous. *Ovary* free, 1-celled; style 2–3-fid, stigmas decurrent; ovule 1, erect or pendulous from a basal funicle. *Utricle* enclosed in the perianth. *Seed* globose lenticular or reniform, testa smooth, albumen floury; embryo straight curved or annular.—Genera 17, species 70, most warm dry regions.

Gymnocarpos fruticosus, Pers., is in the Genera Plantarum (iii. 17) erroneously stated to be a native of Scinde, owing to a misstatement in the Herbarium; it has not been found further east than Beluchistan.

TRIBE I. **Paronychieæ.** *Flowers* clustered, all perfect and similar. *Embryo* annular.

Sepals 5, obtuse. Style 2-fid . . . . 1. HERNIARIA.

TRIBE II. **Pterantheæ.** *Flowers* 3-nate, surrounded by squarrose bracts, the centre one of the 3 alone perfect. *Embryo* nearly straight.

Floral leaves pinnatipartite . . . . 2. COMETES.

1. HERNIARIA, *Linn.*

Tufted prostrate small herbs. *Leaves* opposite or the upper alternate, narrow. *Flowers* minute, in green axillary clusters. *Sepals* 4–5, obtuse, connate below. *Petals* 4–5, minute, setaceous or 0. *Disk* annular. *Stamens* 4–5. *Utricle* indehiscent; style 2-fid; ovule erect. *Seed* subglobose or reniform, testa crustaceous shining; embryo annular.—Species 8 or 10, Europe, N. and S. Africa, W. and Central Asia.

H. hirsuta, *Linn.*; strigosely hirsute, leaves elliptic- or linear-oblong, sepals 5 not so broad as the rigid hairs are long, stigmas very short subsessile.

WESTERN HIMALAYA; from Kashmir to Kunawur, alt. 4–8000 ft., *Royle, &c.* The PANJAB, from the Sutlej to Peshawur.—DISTRIB. Westward to the Atlantic and the Canary Islands.

Branches 2–8 in. long, densely tufted, internodes long or short. *Leaves* $\frac{1}{10}$–$\frac{1}{3}$ in., acute or obtuse, base acute. *Flowers* $\frac{1}{18}$–$\frac{1}{12}$ in. long. *Capsule* as long as the sepals. —I am quite unable to discriminate between the species of *Herniaria*, or to refer this to any descriptions of Boissier. There is plenty of it under several forms in Griffith's Affghan collections, and these Boissier alludes to under both *H. incana*, Lamk., and *H. cinerea*, DC. (Fl. Orient. i. 739). The *incana* form looks at first sight very distinct, but there appear to me to be many intermediates.

VAR. *incana*; hoary, most densely matted, leaves densely crowded $\frac{1}{10}$ in. long, flowers many in a cluster $\frac{1}{30}$ in. long. H. incana, *Lamk. Dict.* iii. 124; *Boiss. Fl. Orient.* i. 741. H. macrocarpa, *Sibth. Fl. Græc.* t. 252. H. Besseri, *Fisch. in Hornem. Suppl. Hort. Bot. Hafn.* 127.

2. COMETES, *Linn.*

Annual branched herbs. *Leaves* opposite, mucronate; stipules setaceous. *Flowers* 3 together, surrounded by feathery at length squarrose bracts, centre flower only perfect. *Sepals* 5, erect, linear-oblong, awned behind. *Stamens* 5, subperigynous, alternating and united with 5 membranous staminodes forming a cup below. *Ovary* narrow; style filiform, stigma 3-toothed; ovule erect. *Utricle* obovoid. *Seed* obovoid, erect, testa membranous; embryo large, on one side of a scanty albumen; cotyledons oblong, plano-convex.—Species 2, N. African and Oriental.

C. surattensis, *Burm. Fl. Ind.* 39, t. 15, f. 5; leaves petioled elliptic acute at both ends, stamens longer than the staminodes. *Boiss. Fl. Orient.* i. 753; *Wall. Pl. As. Rar.* i. 17, t. 17; *Cat.* 810. C. apiculata, *Dcne. in Ann. Sc. Nat. Ser.* 2, ii. 244. Ceratonychia Nidus, *Edgew. in Journ. As. Soc. Beng.* xvi. 1215.

SCINDE, *Vicary, Stocks.*—DISTRIB. Beluchistan, Waziristan, and westward to S. Arabia.

Stem woody below; branches 4–10 in., very numerous, stout, erect, terete, dichotomous. *Leaves* ½–1 in., elliptic, acute at both ends, variable in width; petiole short. *Heads* ½–¾ in. diam., including the feathery rusty appendages which close over the fruit to prevent the escape of the seed, which germinates in the head. *Sepals* with the dorsal awn variable in length. *Stamens* and *staminodes* variable in length.

ORDER CXVI. **AMARANTACEÆ.**

Herbs, rarely shrubs. *Leaves* opposite or alternate, exstipulate. *Flowers* usually in terminal simple or panicled spikes, cymes or clusters (outer in the cluster sometimes deformed); bracts and 2 bracteoles scarious. *Sepals* 5, rigid or scarious, persistent, imbricate in bud. *Stamens* 1–5, opposite the sepals, filaments free or connate below or united with intervening membranous staminodes into a hypogynous cup; anthers 1- or 2-celled. *Ovary* 1-celled; styles 1–3; ovules 1 or more, basal, panicle capillary. *Fruit* a utricle, rarely a berry or capsule, enclosed in or resting on the persistent perianth. *Seed* erect, orbicular or ovate, compressed, testa crustaceous; embryo horseshoe-shaped or annular, surrounding a mealy albumen.—Genera 48, species 480, tropical and subtropical.

TRIBE I. **Celosieæ.** *Leaves* alternate. *Anthers* 2-celled. *Ovary* 2–∞-ovuled.

Fruit a berry. A shrub . . . . 1. DEERINGIA.
Fruit membranous. Herbs . . . . 2. CELOSIA.

TRIBE II. **Amaranteæ.** *Anthers* 2-celled. *Ovary* 1-ovuled.

* Ovule erect. Leaves alternate.

Sepals spreading under the fruit . . . . 3. BOSIA.
Sepals erect, enclosing the fruit.
Flowers panicled, 2-sexual. Utricle indehiscent . . . . . . 4. BANALIA.
Flowers capitate, 2-sexual. Utricle circumsciss . . . . . . 5. ALLMANIA.
Flowers spicate, 2-sexual. Nut crustaceous . . . . 6. DIGERA.
Flowers unisexual . . . . 7. AMARANTUS.

** Ovule suspended from a basal funicle.

† *Flowers clustered,* 1–3 *perfect surrounded by deformed ones. Leaves opposite.*

Stamens with interposed staminodes . . . . 8. CYATHULA.
Stamens without staminodes . . . . 9. PUPALIA.

†† *Flowers all perfect. Staminodes* 0.

Outer sepals 3-ribbed. Stamens 5. Spikes axillary . . . . 10. PSILOTRICHUM.
Outer sepals 3-ribbed. Stamens 5. Spikes panicled . . . . 11. PSILOSTACHYS.
Sepals all hyaline. Stamens 1 or 2 . . . . 12. NOTHÆRUA.

††† *Flowers all perfect. Stamens with interposed staminodes.*

Sepals hyaline, woolly. Staminodes short . . . . 13. ÆRUA.
Sepals scarious, tipped with wool. Staminodes long . . . . 14. STILBANTHUS.
Sepals spinescent . . . . 15. ACHYRANTHES.

TRIBE III. **Gomphreneæ.** *Anthers* 1-celled. *Ovary* 1-ovuled; ovule suspended from a basal funicle. *Leaves* opposite.

Staminal tube very short. Stigma subsessile, capitate . . . 16. ALTERNANTHERA.
Staminal tube long. Style long. Stigma 2-fid . . . . . . 17. GOMPHRENA.

1. DEERINGIA, *Br.*

Rambling or climbing shrubs. *Leaves* alternate, petioled. *Flowers* small, in simple or panicled spikes, 1–2-sexual. *Sepals* 5, oblong, spreading in fruit. *Stamens* 4–5; anthers 2-celled; staminodes 0. *Ovary* ovoid or subglobose; stigmas 2–4, subulate; ovules few or many, funicle long. *Fruit* a globose berry or circumsciss utricle, seated on the spreading perianth. *Seeds* few or many; radicle descending.—Species 5–6, Asiatic, Australian and Pacific.

D. celosioides, *Br. Prodr.* 413; leaves ovate or ovate-lanceolate acuminate, racemes long panicled. *Roxb. Fl. Ind.* i. 682, and *Ed. Wall. & Carey*, ii. 511; *Wight Ic.* t. 728; *Wall. Cat.* 6888; *Dalz. & Gibs. Bomb. Fl.* 214; *Bot. Mag.* t. 2717; *Endl. Iconogr.* t. 62. D. baccata, *Moq. in DC. Prodr.* xiii. 236. D. indica, *Retz. in Blume Bijd.* 542; *Spreng. Syst.* i. 816. Celosia baccata, *Retz. Obs.* v. 23. Cladostachys frutescens, *Don Prodr.* 76, *excl. syn.*—Blitum frutescens, *Rumph. Herb. Amb.* v. t. 83, f. 2.

SUBTROPICAL HIMALAYA; from Simla to Bhotam, alt. 1–5000 ft. ASSAM, SILHET, KHASIA MTS., alt. 0–4000 ft. CHITTAGONG and LOWER BENGAL; at Pubna, *J. D. H. & T. T.* BEHAR; Monghir, *Hamilton*; and Rotas, *J. D. H.* PEGU, *Wallich.* The CONCAN, *Dalz. & Gibs.* (I have seen no specimen).—DISTRIB. Malay Islands, China, Australia.

Blackish or dark green when dry, subscandent, sometimes climbing 18 ft. high; branches long, arching. *Leaves* 2–4 in., base rounded or acute, rarely cordate; petiole $\frac{1}{4}$–1 in. *Spikes* 4–10 in. *Flowers* greenish-white, $\frac{1}{8}$ in. diam.; pedicels short; bracts acute. *Berry* globose, $\frac{1}{6}$–$\frac{1}{4}$ in. diam., scarlet.

2. CELOSIA, *Linn.*

Usually annual herbs. *Leaves* alternate. *Flowers* clustered or spicate, white or pink, shining. *Sepals* scarious, striate or ribbed. *Stamens* 5, united below into a cup; anthers 2-celled; staminodes 0. *Utricle* circumsciss, sometimes corky or thickened. *Seeds* erect, testa crustaceous, radicle inferior or ascending.—Species 30, tropical Asiatic, African and American.

* *Spikes very stout; flowers densely imbricate. Utricle acute; style filiform, lengthening after flowering.*

1. **C. argentea,** *Linn.*; annual, glabrous, erect, leaves linear or lanceolate, spikes long-peduncled cylindric or oblong or ovoid, flowers $\frac{1}{3}$–$\frac{1}{2}$ in., style filiform. *Moq. in DC. Prodr.* xiii. 2, 242; *Roxb. Fl. Ind.* i. 678, and *Ed. Carey & Wall.* ii. 507; *Grah. Cat. Bomb. Pl.* 167; *Dalz. & Gibs. Bomb. Fl.* 215; *Wight Ic.* t. 1767; *Wall. Cat.* 6916; *Boiss. Fl. Orient.* iv. 987. C. linearis, *Sweet Hort. Brit.* 569. C. margaritacea, *L.*, *Wall. Cat.* 6917; *Don Prodr.* 76.—*Rheede Hort. Mal.* x. t. 38, 39.

Throughout INDIA and CEYLON in fields, ascending the hills to 4000 ft. (nowhere really indigenous).—DISTRIB. Trop. Asia, Africa, America, cultivated or introduced.

Stem 1–3 ft., stout or slender, simple or branched. *Leaves* 1–6 in., narrow. *Spikes* solitary, few or many, 1–8 by ¾–1 in.; peduncle slender; flowers white, glistening; bracts much shorter than the acute sepals.—The top of the spike sometimes branches out in a cock's-comb form.

2. **C. cristata,** *Linn.*; annual, glabrous, erect, leaves from linear to ovate acute or acuminate, spikes cylindric, flowers $\frac{1}{6}$–$\frac{1}{4}$ in., style filiform. *Moq. in DC. Prodr.* xiii. 2, 242; *Roxb. Fl. Ind.* i. 679, and *Ed. Wall. & Carey*, ii. 508; *Wall. Cat.* 6918; *Grah. Cat. Bomb. Pl.* 168; *Dalz. & Gibs. Bomb. Fl.* 215. C. cernua, *Roxb. l. c.* 680, and *Ed. Carey & Wall.* 509; *Wall. Cat.* 6919; *Wight Ic.* 730. C. cristata, *Linn.*; *Lamk. Ill.* t. 168; *Wall. Cat.* 6918. C. coccinea, *Linn.*; *Bot. Reg.* t. 1834. C. comosa, *Retz. Obs.* vi. 26; *Andr. Bot. Rep.* t. 635. C. pyramidalis, *Burm. Fl. Ind.* 65, t. 25.

Throughout INDIA, cultivated and as an escape.—DISTRIB. Tropical Asia, Africa and America.

Usually a tall branching plant, with broad ovate-lanceolate leaves, sometimes 9 in. long and 3 broad, and much smaller flowers than *C. cristata*, but narrow-leaved forms are difficult to distinguish. Roxburgh's *C. cernua* is only a very narrow-leaved strict form; I doubt its being indigenous in the Rajmahal hills, where, as Dr. King informs me, there are traces of very old cultivations.—The sportiveness of this species under cultivation, and its tendency to produce cock's-comb crests and feathery branched yellow pink or rose fasciated ends of the spikes, have resulted in the creation of many spurious species. Its native country, like that of *C. argentea*, of which it is no doubt a form, is unknown. Burmann's *C. pyramidalis* is referred by Moquin to *Chamissoa* (Allmania), but the habit is totally dissimilar to that of an *Allmania*, and quite that of *C. cristata*.

** *Spikes very slender, flowers in distant clusters. Utricle obtuse, top thickened; style short, stigmas* 2–3 *recurved. Seeds minute reniform.*

3. **C. pulchella,** *Moq. in DC. Prodr.* xiii. 2, 238; glabrous, leaves petioled ovate acute. *Wight Ic.* t. 1768. C. polygonoides, *Wall. Cat.* 6913.

NILGHIRI HILLS; in moist soil, *Wight*, &c. CEYLON, *Walker*, &c.; in hot drier parts of the island, *Thwaites*.

Slender, 2–3 ft. high, diffusely branched. *Leaves* 1½–2 in., membranous, base cuneate truncate or subcordate; petiole slender, 1–1½ in. *Spikes* 4–10 in., very slender; clusters few-fld.; flowers $\frac{1}{10}$ in. long, white. *Sepals* ovate-oblong, acute. *Utricle* flask-shaped, exserted. *Seeds* minute, reniform, black, opaque.

4. **C. polygonoides,** *Retz. Obs.* ii. 12; branches glabrous or hispidulous, leaves petioled rounded-ovate or -cordate obtuse. Celosia trigyna, *Willd.*; *Wall. Cat.* 6915.

DECCAN PENINSULA; in sandy soil, Mysore and the Carnatic, &c., *Heyne*, &c. CEYLON; north part of the island, *Gardner*.

Slender, 6–10 in. high; stem woody below, diffusely branched. *Leaves* ¾–1½ in. long, often as broad, glabrous or very sparsely hairy, rarely cordate, tip rounded or apiculate; petiole as long as the blade. *Spikes* 3–5 in.; clusters few-fld.; flowers $\frac{1}{10}$ in. long, white. *Sepals* ovate-oblong, acute. *Utricle* flask-shaped, with a very thick exserted head.—Very near the tropical African species.

UNDETERMINABLE SPECIES.

C. ALLMANOIDES, *Moq. in DC. Prodr.* xiii. 2, 243, from Ava, *Wallich*, is possibly an *Allmania*.

C. EXSTIPULATA, *Hornem. in Schrank Syllog. Ratisb.* i. 202; *Moq. l. c.* 244.—Nepal.

C. PATULA, *Willd. in Act. Berol.* vi. 198; *Moq. l. c.* (C. glauca, *Rottl. & Willd. in Nov. Act. Nat. Cur.* iv. 1803).—Mountains of Madras.
C. SANGUINEA, *Hoffmann Verz.* ii. 85; *Moq. l. c.*—East Indies.

3. **BOSIA,** *Linn.* (BOSEA.)

Erect, stout, glabrous, nauseous shrubs. *Leaves* alternate, persistent. *Flowers* small, 2–4-bracteolate, green, spicate or racemose, often polygamous. *Sepals* 5, herbaceous, rounded, concave. *Stamens* 5, inserted on a hypogynous 10-lobed disk; anthers 2-celled. *Ovary* ovoid; stigmas 2–3, sessile, recurved; ovule erect, funicle short. *Berry* globose. *Seed* subglobose, testa crustaceous, albumen fleshy; embryo annular, cotyledons broad.—Species 3, Canaries, Mediterranean, N.W. India.

Bosea trinervia, Roxb. Fl. Ind. ii. 87, is no doubt, as Dr. King informs me, *Celtis Wightii,* Planch.

B. Amherstiana, *Hook. f.*; leaves ovate acute or acuminate, flowers spicate, bracteoles 2–4. Rodetia Amherstiana, *Moq. in DC. Prodr.* xiii. 2, 323; *Gamble Man. Ind. Timb.* 302; Deeringia Amherstiana, *Wall. Cat.* 6889.

WESTERN TEMPERATE HIMALAYA, alt. 4–7000 ft.; from Kumaon, *Amherst, Govan,* to Kashmir, *Thomson.*

Quite glabrous. *Leaves* 3–7 by 1–4 in.; base acute or rounded; blade narrowed into a petiole ¼–½ in. *Spikes* shorter than the leaves. *Flowers* $\frac{1}{6}$ in. diam.; bracts and bracteoles rounded, closely imbricated, green with white margins. *Berries* $\frac{1}{8}$ in. diam.—*Rodetia* differs from the original *Bosia Yerva-Mora* only in the pedicelled flowers and fewer bracts and diœcious flowers, but the flowers are really only polygamous, and the *Bosia cypria* of Boissier (from Cyprus) has sessile flowers and bracts imbricating as in *Rodetia.*

4. **BANALIA,** *Moq.*

An erect, glabrous, branching herb. *Leaves* alternate, membranous. *Flowers* in axillary and terminal panicled spikes. *Sepals* 5, membranous, linear-oblong, acute, 3-nerved. *Stamens* 5, united below into a cup, anthers 2-celled. *Ovary* ovoid, compressed; style erect, stigmas 2 linear; ovule erect. *Utricle* subglobose, indehiscent. *Seed* orbicular, testa black crustaceous; embryo annular.

B. thyrsiflora, *Moq. in DC. Prodr.* xiii. 2, 278; *Wight Ic.* t. 1774. Celosia thyrsiflora, and C. missionis, *Wall. Cat.* 6914, 6915 A. B. Achyranthes thyrsiflora & polygonata, *Herb. Heyne.*

NILGHIRI MTS., alt. 4–7000 ft.; *Heyne,* &c.

A tall very slender herb, branches angular. *Leaves* 3–4 in., ovate or ovate-lanceolate, acuminate. *Flowers* in large thyrsoid white panicles, sessile, $\frac{1}{8}$ in. long.

5. **ALLMANIA,** *Br.*

Herbs. *Leaves* alternate, narrow. *Flowers* in axillary and terminal globose or ovoid heads. *Sepals* 5, scarious, acuminate, striate. *Stamens* 5, united below into a cup; anthers 2-celled; staminodes 0. *Ovary* ovoid; style slender, stigma capitellate; ovule 1, erect. *Utricle* circumsciss. *Seed* erect, aril cupular, testa crustaceous; embryo annular, cotyledons linear flat.—Species 2 or 3, tropical Asiatic.

1. **A. nodiflora,** *Br. in Wall. Cat.* 6890, *excl. B;* annual, diffusely

dichotomously branched, leaves short or long from linear or oblong to spathulate and orbicular, heads sessile axillary and terminal globose.

SIKKIM TERAI, *Clarke*. MYSORE and the CARNATIC, MALACCA, SINGAPORE and CEYLON.—DISTRIB. China, Malay Islands.

Rootstock sometimes woody; branches rigid or flaccid, 6–12 in., glabrous or hispidly hairy. *Leaves* excessively variable, membranous or rigid. *Heads* ⅓–1 in. diam., white or brown. *Seeds* turgidly lenticular, opaque or shining.—The following forms are certainly varieties of no great constancy.

VAR. *angustifolia*; glabrous, rarely with a few scattered hairs, often tall, leaves 1–3 in. oblong or linear-oblong or elongate obovate-oblong obtuse or acute, heads usually large. A. nodiflora, *Wall. Cat.* 6980 A. C. E *in part*. Chamissoa angustifolia, *Herb. Ham.* C. javanica, *Hassk. Pl. Jav. Rar.* 434.—Mysore, Ceylon, widely diffused. Java, Sumatra.—A tall slender unbranched form of this occurs, apparently drawn up amongst grass, &c.

VAR. *dichotoma*; glabrous or nearly so, leaves shortly petioled ¾–1½ in. elliptic acute, heads ⅓–½ in. A. nodiflora, *Wall. Cat.* 6890 E. *in part*. A. dichotoma, *Wight Ic.* t. 1771. Celosia dichotoma, *Heyne in Roth Nov. Sp.* 172.—Courtallum, *Wight*.

VAR. *Roxburghii*; glabrous or pubescent, leaves 1–2 in. spathulate or orbicular-spathulate often apiculate. A. nodiflora, *Wight in Hook. Journ. Bot.* i. (1834), 226, t. 128; *Wall. Cat.* 6890 E *in part*. Achyranthes nodiflora, *Roxb. Fl. Ind.* i. 678. Celosia nodiflora, *Linn. Sp. Pl.* 205; *Roth Nov. Sp.* 17; *Burm. Fl. Zeyl.* 16, t. 5, f. 2. —Mysore, the Carnatic and Ceylon.

VAR. *aspera*; hispidly hairy, other characters of Var. *angustifolia*. A. aspera, *Wight Ic.* t. 1770. Celosia aspera, *Roth Nov. Sp.* 173; *Moq. l. c.* 244. Chamissoa dichotoma, *Moq. l. c.* 249.—Corn-fields, Coimbatore and Mysore.

VAR. *procumbens*; diffuse, branches prostrate often several feet long from a slender or stout (perennial?) woody branched stock, glabrous or scabrid, leaves small ½–¾ in. spathulate or linear mucronate, heads small ⅓–½ in. *Wall. Cat.* 6980 E *in part*. A. procumbens, *Wight mss.* A. nodiflora, *Wight Ic.* t. 1770.—Sands and Red Hills at Madras.—DISTRIB. Java.

VAR. *esculenta*; flaccid, glabrous, leaves 1–2 in. very narrow linear, heads usually small sometimes pedicelled. A. esculenta, *Br. in Wall. Cat.* 6892; *Moq. l. c.* 249. Chamissoa Brownii, *Steudel Nomencl. Ecl.* i. 344.—Malacca and Singapore.

2. **A. albida,** *Br. in Wall. Cat.* 6981; annual, erect or suberect, leaves short or long from linear to spathulate or obcordate, heads ovoid or oblong rarely globose peduncled. Chamissoa albida, *Mart. Beitr. Amarant.* 79; *Wight Ic.* t. 1769. C. pyramidalis, *Moq. l. c.* Celosia pyramidalis, *Burm. Fl. Ind.* 65, t. 25. C. albida, *Willd. Sp. Pl.* i. 1197. C. nodiflora, *Wall. Cat.* 6890 B.

The CARNATIC; in sandy soil near the coast, *Wight*, &c. CEYLON, common.—Java, Philippines.

Usually tall, erect, 1–2 ft. high, with erect branches, and foliage simulating many of the forms of *A. nodiflora*, of which Thwaites regards it as a form, but I can scarcely agree with him.

6. DIGERA, *Forsk.*

An annual herb. *Leaves* alternate. *Flowers* spicate, 3-nate, the 2 outer reduced to crested scales. *Sepals* 4–5, oblong, outer larger 5–9-nerved, inner 2–4-nerved. *Stamens* 5, free; anthers 2-celled; staminodes 0. *Ovary* oblong, truncate; style filiform, stigmas 2 recurved; ovule 1, erect. *Nut* subglobose, compressed, rugulose. *Seed* globose, erect, testa thin crustaceous, adhering to the albumen; embryo annular, cotyledons linear.

D. arvensis, *Forsk. Fl. Æg. Arab.* 65; *Moq. in DC. Prodr.* xiii. 2,

324; *Griff. Notul.* iv. 343, and *Ic. Pl. Asiat.* t. 527; *Dalz. & Gibs. Bomb. Fl.* 218, f. 2. D. muricata & ciliata, *Mart. Beitr. Amaranth.* 77; *Wall. Cat.* 6886, 6887. D. ciliata, *Moq. l. c.* D. Forskalii, *Blume Bijd.* 542. D. alternifolia, *Aschers. in Schweinf. Beitr.* 180; *Boiss. Fl. Orient.* iv. 994. Desmochete alternifolia, *DC. Cat. Hort. Monsp.* (1813), 103. D. muricata, *Wight Ic.* t. 732. D. ciliata, *Roem. & Sch. Syst.* v. 553; *Mart. l. c.* 113; *Wall. Cat.* 6887. Achyranthes polygonoides *Retz. Obs.* ii. 12 (*not of Heyne*). A. Digera, *Poir. Dict. Suppl.* i. 2, 11. A. alternifolia, *Linn. Mant.* 50, 341; *Roxb. Fl. Ind.* i. 674, and *Ed. Carey & Wall.* ii. 500. A. muricata, β, *Willd. Sp. Pl.* i. 1193. Chamissoa arabica, ciliata, commutata & muricata, *Spreng. Syst.* i. 815. Cladostachys alternifolia, *Sweet Hort. Brit. Ed.* 3, 570. C. muricata, *Moq. l. c.* 235.

BENGAL and N.W. INDIA in the plains to Peshawur and the Salt range. PEGU, *Wallich.* SOUTH DECCAN; the Concan, Mysore, and the Carnatic, *Heyne*, &c. CEYLON, N. part of the island.—DISTRIB. Java, Affghanistan and Beluchistan to Arabia and N. Africa.

A glabrous or ciliate slender annual, 1–2 ft. high, becoming perennial, with spreading branches, prostrate below. *Leaves* very variable, membranous, ½–3 in., ovate and acute or elliptic or rounded, base rounded or cuneate; petiole ½–2 in., slender. *Spikes* 1–3 in., slender, axillary, long or short peduncled; bracts subulate, persistent; owers ⅛ in. in distant clusters, greenish. *Seeds* pale.

7. AMARANTUS, *Linn.*

Annuals. *Leaves* alternate. *Flowers* unisexual, small, in axillary clusters, or in panicled erect or drooping densely or laxly spiked clusters. *Sepals* 5 or 1–3, ovate oblong linear lanceolate or aristate. *Stamens* 1–5, free; anthers 2-celled; staminodes 0. *Ovary* compressed; style short or 0, stigmas 2–3 filiform or subulate; ovule 1, erect. *Utricle* compressed, indehiscent or circumsciss, tip entire or 2–3-toothed. *Seed* orbicular, compressed, testa crustaceous; embryo annular, cotyledons linear.—Species undetermined, tropical and subtropical, a large proportion known only in cultivation.

* *Bracts setaceous or awned, exceeding the* 5 *sepals. Stamens* 5. *Utricle circumsciss, top* 2–3-*fid.*

1. **A. spinosus,** *Linn.*; erect, glabrous, stem terete, leaf-axils with 5 spines, leaves long-petioled ovate or oblong obtuse, flowers in axillary clusters and long dense- or lax-fld. spikes, bracts setaceous equalling or exceeding the sepals, stamens 5, utricle rugose nearly equalling the sepals. *Moq. in DC. Prodr.* xii. 2, 260; *Willd. Amarant.* t. 4, f. 8; *Roxb. Fl. Ind.* iii. 611; *Grah. Cat. Bomb. Pl.* 169; *Dalz. & Gibs. Bomb. Fl.* 216; *Wight Ic.* t. 513; *Wall. Cat.* 6894.

Throughout INDIA and CEYLON, in waste places, fields and gardens.—DISTRIB. Various tropical countries.

Stem 1–2 ft., hard; spines straight, ⅜ in. and under. *Leaves* 1½–4 by ¾–2 in., base cuneate; petiole slender, equalling the blade or shorter. *Flowers* $\frac{1}{24}$ in. long. *Sepals* of male acuminate, of female obtuse apiculate. *Stigmas* 2. *Utricle* with a thickened top. *Seeds* $\frac{1}{30}$ in. diam., black, shining, border obtuse not thickened.—The plant varies in colour from green to red and purple.

2. **A. paniculatus,** *Linn. Sp. Pl. Ed.* 2, 1406; tall, robust, stem striate, leaves long-petioled elliptic- or ovate-lanceolate acute or finely acuminate, spikes in dense thyrses squarrose from the long recurved bracts, centre one

longest, bracts acicular recurved very much longer than the oblong-lanceolate acuminate sepals. *Moq. in DC. Prodr.* xiii. 2, 257; *Willd. Amarant.* 32, t. 2, f. 4; *Wall. Cat.* 6904, *excl. F*; *Dalz. & Gibs. Bomb. Fl.* 215. A speciosus, *Sims Bot. Mag.* t. 2227; *Don Prodr.* 75. A sanguineus, *Linn.*; *Willd. l. c.* t. 2, f. 3; *Mill. Icon.* t. 22. A. strictus, *Willd. l. c.* t. 3, f. 5. A. frumentaceus, *Ham. in Roxb. Fl. Ind.* iii. 610; *Moq. l. c.* 265; *Wight Ic.* t. 720. A. farinaceus, *Herb. Roxb.* A. Anacardana, *Ham. in Wall. Cat.* 6903; *Moq. l. c.* 256. A. flavus, var. δ. bracteatus, *Linn.*; *Moq. l. c.* 258.

Cultivated throughout INDIA and CEYLON, and up to 9000 ft. in the HIMALAYA.—DISTRIB. Cultivated or an escape in E. and W. Asia, and Africa.

Stem 4–5 ft., sometimes thicker than the thumb, glabrous or puberulous. *Leaves* 2–6 by 1–3 in., base cuneate; petiole as long. *Spikes* suberect, red, green or yellow. *Seeds* $\frac{1}{16}$ in. diam., either yellowish-white or pitchy black with a thickened rounded border, or pitchy with a narrow thin border.—I follow Moquin, Wallich, &c., in referring this to *paniculatus* of Linnæus with some doubt, and I am still more perplexed about the synonyms I have cited, some of which may belong to the following species. Boissier says of *A. paniculatus* that it is an introduction from America, whereas this has been cultivated in India from time immemorial. Like the following, of which it may be a form, the seeds vary extraordinarily in size, form and colour.

3. **A. caudatus,** *Linn. Sp. Pl.* 990; tall, robust, stem striate, leaves long-petioled elliptic- or ovate-lanceolate, tip obtuse, spikes in dense soft thyrses hardly squarrose, centre one and often the lateral usually very long and pendulous, bracts acicular longer than the obovate mucronate sepals. *Moq. in DC. Prodr.* xiii. 2, 255; *Wall. Cat.* 6907; *Boiss. Fl. Orient.* iv. 988. A. paniculatus, *Wall. Cat.* 6904 F. A. cruentus, *Willd., Roxb. l. c.* 610. A. caudatus and A. Alopecurus, *Hochst.*; *Bouché & Braun in Append. Obs. Bot. ad Ind. Sem. Hort. Berol.* 1872, 1.

Cultivated in various parts of INDIA.—DISTRIB. Various hot countries, wild or cultivated.

I find it very difficult to distinguish some states of this from *A. paniculatus.* In its typical state it is a smaller plant with the leaves obtuse at the tip, more globose softer masses of smaller red green or white flowers on the thryse, the terminal spike of which is very long, thick and drooping; the acicular bracts are shorter and not squarrose, the sepals shorter, broader, more obtuse and usually obovate-oblong, and the utricle and seeds are smaller; the latter present the same variations as in *A. paniculatus.* Bouché and Braun, from an examination of Abyssinian specimens cultivated at Berlin, point out the remarkable distinction between the two forms of seeds that this and the foregoing species produce, one white or yellow with a very thick rounded border (the true *caudatus* of old authors); the other lenticular and pitch-black with a compressed border (*A. alopecurus*, Hochst.). The plants which bear them, however, present no other differences, and I have seen the black seed with the thick border.

** *Bracts subulate, equalling or exceeding the* 3 *lanceolate sepals and utricle. Stamens* 3. *Utricle circumsciss.*

4. **A. gangeticus,** *Linn.*; *Moq. in DC. Prodr.* xiii. 2, 261; erect, glabrous, leaves long-petioled ovate oblong or lanceolate obtuse or emarginate, clusters crowded in the lower axils and forming a long terminal spike, bracts awned, sepals long-awned much longer than the utricle. *Willd. Amarant.* t. 6, f. 11; *Roxb. Fl. Ind.* iii. 606; *Wall. Cat.* 6896, *excl. C.* A. tricolor, *Linn. Sp. Pl.* 989; *Roxb. l. c.* 608, and *Wall. Cat.* 6902. A. lanceolatus, *Roxb. l. c.* 607; *Wall. Cat.* 6895. A. tristis, *Linn. Sp. Pl.* 989?; *Roxb. l. c.* 604; *Wall. Cat.* 6905, A. C; *Grah. Cat. Bomb. Pl.* 169; *Wight Ic.* t. 713; *Dalz. & Gibs. Bomb. Fl.* 215. A. oleraceus, *Roxb. l. c.* 605; *Grah. l. c.*; *Wight Ic.* t. 715, and *Thwaites Enum.* 247, *not of Linnæus.*

A. polygamus, *Roxb. l. c.*; *Wall. Cat.* 6899, *excl. D*, and *Wight Ic.* 714, *not of Linn.* A. lividus, *Roxb. l. c.*; *Wall. Cat.* 6896 C. A. amboinicus, *Herb. Ham. in Wall. Cat.* 6897. A. inamœnus, *Willd. Amarant.* t. 7, f. 14. A. melancholicus, *Linn. Sp. Pl.* 989; *Roxb. l. c.* 608.

Throughout INDIA and CEYLON, cultivated and in cultivated ground.—DISTRIB. Tropical Asia, Africa, and America.

An erect, stout, handsome species, 2–3 ft., leafy, green, pink, rufous, liver-coloured or bright red. *Leaves* 2–5 in., very variable, from linear-lanceolate to rounded oval and 3 in. diam., or deltoid ovate; tip rounded or long and slender but always obtuse and often notched, base elongate cuneate; petiole equalling the blade. *Clusters* squarrose, bracts $\frac{1}{6}$ in. long. *Seeds* lenticular, pitch-black, $\frac{1}{20}$ in. diam.; border acute.—This is Roxburgh's *A. tristis*, and possibly that of Linnæus, but the latter describes the leaves as ovate-cordate, which these are not. Roxburgh says that his *gangeticus* and *oleraceus* differ from his *polygamus* and *tristis* and their varieties in not admitting of being cut for successive crops, but being hence unrooted for market. I have not cited Boissier, who says his *A. gangeticus* is always pentamerous. Of *A. melancholicus* Roxburgh says that it differs from *tricolor* in being 6–12 ft. high, ramous, pyramidal, with more remote broader rarely more than 2-coloured (dull livid purple and bright crimson) leaves, whereas *tricolor* in the same soil is 3–4 ft. with simple erect stem, many numerously variegated leaves, and long axillary clusters of flowers. *A. inamœnus*, Wall. Cat. 6905 C, is a curious small state, 6 in. high, erect, strict, with rhomboid leaves and long spikes; it is the *A. tristis*, Herb. Rottler and Heyne.

5. **A. mangostanus,** *Linn. Amœn. Acad.* iv. 294; branches diffuse, leaves small long-petioled ovate elliptic or deltoid-ovate obtuse emarginate, clusters green all axillary, bracts awned, sepals lanceolate awned longer than the utricle. *Moq. in DC. Prodr.* xiii. 2, 261; *Willd. Amarant.* t. 12, f. 23. A. polygamus, *Thwaites Enum.* 247. A. tristis, *Wall. Cat.* 6905 B.

Throughout INDIA and CEYLON in cultivated ground.

This, as Thwaites observes, is extremely near and perhaps a form of *A. gangeticus*, of smaller size and procumbent habit; he refers it to Roxburgh's *A. polygamus*, but I think that the want of a terminal spike is against this. A specimen from Roxburgh, marked *A. mangostanus*, precisely accords with Willdenou's figure. To me it looks like a starved or stunted form of *gangeticus*; the perianth and seeds are the same in both. It is *A. mucronatus*, Hort. Petrop.

6. **A. Caturus,** *Heyne in Wall. Cat.* 6900; tall, glabrous, leaves long-petioled elliptic-lanceolate acuminate thin, nerves very slender, clusters small globose soft green in very long and very slender axillary simple and terminal panicled spikes, the upper confluent, bracts equalling or longer than the lanceolate aristate sepals, ovary elongate.

DECCAN PENINSULA, *Heyne*.

Stem 2–3 ft., very slender. *Leaves* 6 by 2 in., decurrent on the equally long slender petiole, tip apiculate. *Spikes* 6–10 in. long. *Clusters* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., the lower axillary; the lowest on the rachis remote. *Flowers* $\frac{1}{12}$ in. long; sepals transparent with a green rib and short awn. *Stamens* 3, anthers linear. *Young utricle* with a rather longer neck and 3 slender styles.—I know of no species at all like this; none has such slender spikes.

*** *Bracts usually shorter than the* 2 *or* 3 *sepals and utricle. Stamens* 2 *or* 3. *Utricle indehiscent or circumsciss.*

7. **A. viridis,** *Linn. Sp. Pl.* 1405; erect, glabrous, leaves long-petioled ovate, tip rounded or notched, base truncate or cuneate, clusters very small green in axillary and terminal panicled slender spikes, sepals 3, utricle rugose acute indehiscent. *Roxb. Fl. Ind.* iii. 605; *Grah. Cat. Bomb. Pl.* 169. A. polystachyus, *Ham. in Wall. Cat.* 6901. A. fasciatus, *Roxb. l. c.* 609;

Wight Ic. t. 717 (*bad*); Euxolus caudatus, *Moq. in DC. Prodr.* xiii. 2, 274; *Wight Ic.* t. 1773. Albersia caudata, *Boiss. Fl. Orient.* iv. 992. Chenopodium caudatum, *Jacq. Ic. Rar.* t. 344.

Throughout INDIA, in waste places.—DISTRIB. All tropical and warm countries.

Stem 1–2 ft., rarely decumbent below. *Leaves* 1–2 in., variable in breadth; petiole equalling the blade or shorter. *Clusters* lax, on slender branches; flowers $\frac{1}{30}$ in. long; bracts and sepals ovate-oblong, acute, membranous with a green keel. *Styles* 2–3. *Seed* $\frac{1}{30}$ in diam., pitchy black, border obtuse.—This is the *A. viridis* of *Herb. Linn.* A. fasciatus, *Roxb.*, is a sport with a pale crescentic band across the leaf.—Eaten, but not cultivated (*Roxb.*).

8. **A. Blitum,** *Linn. Sp. Pl.* 990; annual, erect or decumbent, glabrous, leaves long-petioled oblong-ovate or rounded obtuse retuse or 2-lobed, base acute, clusters all axillary or the upper in a dense or lax spike, sepals 3 shorter than the utricle linear-oblong or -lanceolate obtuse and apiculate or acute, utricle orbicular or broadly ovate membranous dehiscent or not.

Waste places throughout INDIA and CEYLON.—DISTRIB. temperate and tropical regions.

I find it impossible satisfactorily to discriminate the Indian forms of this variable weed from one another, and from *A. polygamus*; I recognize the following varieties as more or less constant.

A. Blitum, Linn. Herb.; procumbent, leaves small 2-lobed, sepals oblong obtuse apiculate, clusters small all axillary, utricle indehiscent (A. Blitum, *Herb. Fries e Scania*). A tristis, *Wall. Cat.* 6905 D.—A weed, not cultivated.

VAR. *A. oleraceus*, Linn. Sp. Pl. 1403; tall, succulent, usually erect, leaves ovate oblong or rounded, top rounded or 2-lobed, clusters axillary and in terminal simple or lobed spikes, sepals linear-oblong obtuse or acute, utricle indehiscent. *Willd. Amarant.* t. 5, f. 9. A. adscendens, *Reichb. Ic. Crit.* v. t. 472 (*by error* spicatus). A. gangeticus, *Wall. Cat.* 6896 C. A. polygamus, *Wall. Cat.* 6899 D. Euxolus oleraceus, lividus & viridis, *Moq. in DC. Prodr.* xiii. 273. E. oleraceus, *Dalz. & Gibs. Bomb. Fl.* 216. Albersia oleracea & livida, *Kunth Fl. Berol.* ii. 144. Pyxidium oleraceum, lividum & viride, *Moench Meth.* 359.—Cultivated in India and elsewhere.—I find this in the Kew Herbarium as *A. Blitum*, Japan (Maximov.); Geneva (Herb. Boiss.); *A. lividus*, Hort. Petrop.; *A. adscendens*, Hort. Petrop. and Herb. Requien; *A. Blitum*, var. *adscendens*, Herb. Gay; and *A. miniatus*, Hort. Avignon and Monsp.

VAR. *A. sylvestris*, Desf. Cat. Hort. Par. 41; erect, simple or branched, leaves oblong or obovate-oblong obtuse, clusters all axillary sessile, sepals linear keeled mucronate, utricle rugose or smooth circumsciss. *Boiss. Fl. Orient.* iv. 990. A. Blitum, *var.* sylvestris, *Moq. l. c.* 263.—Kashmir, alt. 4–6000 ft., *Thomson* (Europ., Asiat.).

9. **A. polygamus,** *Linn. Amœn. Acad.* iv. 294 (*not of Roxb.*); stem prostrate or ascending, leaves small obovate oblong or ovate obtuse rarely retuse or 2-lobed, often rigid and apiculate, clusters all axillary, sepals 3 as long as the utricle or shorter subulate acuminate, utricle ovoid rugose dehiscent or not. *Thwaites Enum.* 247. A. polygonoides, *Roxb. Fl. Ind.* iii. 602; *Wight Ic.* t. 512, 719; *Wall. Cat.* 6906. A. Blitum, *var.* polygonoides, *Moq. in DC. Prodr.* xiii. 2, 263. A. tenuifolius, *Wall. Cat.* 6893 E. Amblogyna polygonoides, *Dalz. & Gibs. Bomb. Fl.* 219. Albersia polygama, *Boiss. Fl. Orient.* iv. 991. Euxolus polygamus, *Moq. in DC. Prodr. l. c.* 272; *Thwaites Enum.* 248, *excl. syn. Amblogyne.*

Throughout INDIA and CEYLON, abundant.—DISTRIB. All hot countries.

I believe that this can only be ranked as a form of *A. Blitum* (the Linnean form), with small usually obovate apiculate leaves, fewer flowers in a cluster, often larger more subulate sepals and smaller more acute utricles.

VAR. *angustifolia*; stems and branches angled grooved rigid erect or ascending, leaves linear or linear-oblong more rigid.—The Panjab, *Thomson.* Mooltan, *Edge.*

worth. The Carnatic *Perrottet.*—This is almost identical with *A. græcizans*, Linn. (*A. Blitum*, var. *græcizans*, Moq.; *A. sylvestris*, var. *græcizans*, Boiss.).

10. **A. tenuifolius,** *Willd. Sp. Pl.* iv. 381; glabrous, branches many spreading from the root prostrate or ascending, leaves small petioled linear-oblong or widened to the rounded obtuse or 2-lobed tip, clusters minute all axillary, sepals 2 oblong concave nearly as long as the orbicular compressed membranous indehiscent utricle. *Roxb. Fl. Ind.* iii. 602; *Wight Ic.* t. 718; *Wall. Cat.* 6893, *excl. E.* A. angustifolius, *Roxb. mss.* Mengea tenuifolia, *Moq. in DC. Prodr.* xiii. 2, 271; *Dalz. & Gibs. Bomb. Fl.* 218.

BENGAL, the GANGETIC VALLEY and PANJAB.—DISTRIB. Tropical Africa.

Branches slender, 6–18 in., leafy. *Leaves* very variable, $\frac{1}{2}$–1 in. long, narrowed into the petiole. *Clusters* smaller than in any other species, green. *Stamens* 2. *Utricle* plicate when dry. *Seed* $\frac{1}{16}$ in. diam., brown, lenticular, border obtuse.

DOUBTFUL SPECIES.

A. ATROPURPUREUS, *Roxb. Fl. Ind.* 688, is a garden plant, possibly a form of *A. oleraceus.*

A. CAMPESTRIS, *Willd. Sp. Pl.* iv. 382; *Moq. in DC. Prodr.* xiii. 2, 264, is undeterminable.

A. RUBRICAULIS, *Page Hort. Angl.* (*fid. Moq. l. c.* 267) name only, is indeterminable.

8. CYATHULA, *Lour.*

Herbs or undershrubs. *Leaves* opposite. *Flowers* clustered, clusters solitary spicate and reflexed in fruit, or in dense globose solitary or spicate heads; perfect flowers 1–2 in each cluster, surrounded by imperfect ones reduced to sepals with rigid hooked awns. *Sepals* 5, scarious, 1-nerved, acuminate or with hooked rigid awns. *Stamens* 5, connate, united below with the linear lacerate or 2-fid staminodes into a cup; anthers 2-celled. *Ovary* obovoid; style filiform, stigma capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* ovoid, indehiscent, top areolate. *Seed* inverse, oblong, testa coriaceous; embryo annular, cotyledons linear flat.—Species 10, tropical Asia, Africa and America.

* *Clusters of flowers in large globose heads.*

1. **C. tomentosa,** *Moq. in DC. Prodr.* xiii. 2, 327; densely tomentose or woolly, leaves short-petioled elliptic acute or acuminate, base acute, heads globose spicate. C. Sequax, *Moq. mss.* Achyranthes tomentosa, *Roth Nov. Sp.* 167; *Wight Ic.* t. 1781. A. Sequax, *Wall. in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 506. Desmochæta tomentosa, *Roem. & Sch. Syst.* v. 554. Polyscelis Sequax, *Wall. Cat.* 6939.

TEMPERATE HIMALAYA; from Dalhousie to Bhotan, alt. 2–6500 ft., *Wallich*, &c. KHASIA MTS., alt. 2–5000 ft.

A straggling undershrub, variable in density of tomentum; branches strict, obtusely 4-angled. *Leaves* 2–10 in., rarely orbicular or elliptic-lanceolate, pubescent or glabrate above, often velvety or subsilky beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* 2–6 in. long peduncled; heads close or distant, 1–1$\frac{1}{2}$ in. diam., white, glistening; bracts ovate below, back hairy. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., linear-lanceolate, 2 or all ending in hooked awns, lengthening in age. *Staminodes* fimbriate. *Anthers* linear. "*Utricle* 2-nerved; seed ovate shining," *Wallich.*—I find no seed in any of the numerous specimens.

2. **C. capitata,** *Moq. in DC. Prodr.* xiii. 2, 329; sparsely hairy, leaves short-petioled elliptic subcaudate-acuminate, base acute, heads globose sub-

solitary peduncled bracteate or not. *Wight Ic.* t. 1782. Polyscelis capitata, *Wall. Cat.* 6940.

TEMPERATE HIMALAYA; from Dalhousie to Sikkim, alt. 6–9000 ft.

More herbaceous and slender than *C. tomentosa*. *Leaves* 2–5 in., membranous; petiole ¼–1 in. *Heads* 1–1¼ in diam., white, glistening; flowers as in *C. tomentosa*.

3. **C. ceylanica,** *Hook. f.*; erect, tomentose, leaves subsessile elliptic subacute, heads globose solitary. C. capitata, *Thwaites Enum.* 249.

CEYLON; near Kandy, *Thwaites*.

Branches slender, terete. *Leaves* 1½–2 in., pubescent above, tomentose beneath. *Heads* 1 in. diam. *Sepals* villous.—The specimens are very indifferent. The leaves resemble those of the African *C. globulifera*, Moq., but the branches are more slender and the leaves almost sessile.

** *Clusters of flowers small, solitary, spicate, reflexed.*

4. **C. prostrata,** *Blume Bijd.* 549; annual, stem creeping below, branches erect or ascending, leaves subsessile elliptic rhomboid-oblong or subpanduriform obtuse, spikes very slender terminal peduncled. *Moq. in DC. Prodr.* xiii. 2, 326; *Dalz. & Gibs. Bomb. Fl.* 219. C. repens, *Moq. l. c.* 330. Achyranthes prostrata, *Linn.*; *Roxb. Fl. Ind.* i. 674, and *Ed. Carey & Wall.*, ii. 501; *Grah. Cat. Bomb. Pl.* 168. A. repens, *Heyne in Roth Nov. Sp.* 167. A. debilis, *Poir. Dict. Suppl.* i. 2, 10. Desmochæta prostrata & micrantha, *DC. Cat. Hort. Monsp.* 1813, 102. D. prostrata, *Wight Ic.* t. 733. D. patula? *Wall. Cat.* 6937. D. repens, *Roem. & Sch. Syst.* v. 552; *Wall. Cat.* 6938. Pupalia prostrata, *Mart. Beitr. Amarant.* 113.—*Rheede Hort. Mal.* x. t. 79.

BENGAL, SIKKIM, KHASIA MTS., CHITTAGONG to MALACCA, the DECCAN PENINSULA, BURMA, and CEYLON.—DISTRIB. Tropical Asia, Africa, Australasia, Oceania, and America.

Very slender, 1–2 ft. high, glabrous or scaberulous. *Leaves* 1–2 in., base narrowed often suddenly from below the middle. *Spikes* 4–6 in., rarely paniculately branched. *Clusters* of flowers ⅛ in. long, ovoid, blueish. *Sepals* oblong, pubescent, outer (of imperfect flowers) as long as the perfect. *Staminodes* 2-fid or retuse. *Seeds* ovoid-oblong.—Roxburgh believes this to have been introduced into Bengal from the Moluccas.

9. PUPALIA, *Juss.*

Herbs or undershrubs. *Leaves* opposite. *Flowers* in spicate clusters, perfect and imperfect; the imperfect reduced to awns bearing stellately spreading hooked bristles. *Sepals* 5, herbaceous, acuminate, 3–5-nerved. *Stamens* 5, nearly free below; anthers 2-celled; staminodes 0. *Ovary* ovoid; style slender, stigma capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* ovoid, compressed, indehiscent, top areolate.—Species 3, Asiatic and African.

1. **P. atropurpurea,** *Moq. in DC. Prodr.* xiii. 2, 331; slender, erect, leaves petioled ovate or elliptic acute or acuminate, spikes long, rachis slender, clusters remote bracteate woolly, sepals broadly 3-nerved, laxly villous. *Dalz. & Gibs. Bomb. Fl.* 219; *Miq. Fl. Ind. Bat.* i. 1046. Achyranthes lappacea, *Linn. Sp. Pl. Ed.* 2, 95 (*excl. syn. Ed.* 1); *Roxb. Fl. Ind.* i. 673, and in *Ed. Carey & Wall.* ii. 500. A. atropurpurea, *Lamk. Dict.* i. 546. Desmochæta atropurpurea, *DC. Cat. Hort. Monsp.* 102; *Wall. Cat.* 6933, *excl. K*; *Wight Ic.* t. 731; *Grah. Cat. Bomb. Pl.* 1230.—*Burm. Fl. Zeyl.* t. 18, f. 1; *Rheede Hort. Mal.* x. t. 59.

NEPAL, *Wallich.* BENGAL; Maldah, *Clarke.* DECCAN PENINSULA, from Guzerat southward, Singapore and Penang, *Wallich.* CEYLON.—DISTRIB. Java, Madagascar, S. Africa, Philippines.

Biennial or annual, 2–5 ft.; branches long, straggling, glabrous. *Leaves* 1–5 in., membranous, narrowed into the (½–1 in.) petiole. *Spikes* 1–10 in.; rachis sparsely pubescent; clusters sessile, flowering ¼ in., fruiting rarely ½ in. diam.; bracts broadly ovate, pungent. *Sepals* ovate-lanceolate, woolly. *Awns* often purplish.

2. **P. orbiculata,** *Wight Ic.* t. 1783; sparsely pubescent, robust, leaves short-petioled orbicular very broadly ovate or elliptic obtuse or retuse nearly glabrous, spikes stout, clusters distant woolly. *Dalz. & Gibs. Bomb. Fl.* 219. Cyathula orbiculata, *Moq. in DC. Prodr.* xiii. 2, 330. Achyranthes orbiculata, *Heyne in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 507. A. rotundifolia, *Klein. mss.* Desmochæta orbiculata, *Wall. Cat.* 6936.

CONCAN GHATS (*Dalzell*). The CARNATIC; in sandy soil near the sea, *Heyne,* &c. CEYLON; Jaffna, *Moon.*

Stem stout, erect from a woody stock, terete, glabrate or hispidulous, rarely tomentose. *Leaves* 1–1½ in. diam., rigid and brown when dry, suddenly narrowed into the flattened petiole. *Spikes* 4–8 in., rachis stout, sparsely hairy or pubescent; when flowering clusters ¼ in. long, fruiting ⅜ in., spines pale; outer bract short with a long spine, inner narrow.

3. **P. lappacea,** *Moq. in DC. Prodr.* xiii. 2, 331; shrubby below, tomentose, leaves short-petioled from broadly ovate to lanceolate acute or subacute, clusters remote or approximate, outermost bract very broad membranous, sepals 3-nerved, densely woolly. *Dalz. & Gibs. Bomb. Fl.* 219; *Miquel Fl. Ind. Bat.* i. 1046. Achyranthes lappacea, *Linn. Sp. Pl. Ed.* i. 204. A. echinata, *Retz. Obs.* ii. 12. A. patula, *Linn. Suppl.* 160. A. lappacea, echinata & patula, *Willd. Sp. Pl.* i. 1192, 1193. A. styracifolia, *Lamk. Dict.* i. 546, *excl. syn.* Desmochæta flavescens, *DC. Cat. Hort. Monsp.* 102; *Wall. Cat.* 6934. D. patula, *Roem. & Schult. Syst.* v. 550. Amarantus arctioideus, *Perrottet Pl. Exsic.* No. 94.

UPPER GANGETIC VALLEY and PANJAB. WESTERN TROPICAL HIMALAYA, alt. 1–3000 ft., from Kashmir to Kumaon. BEHAR, SCINDE, GUZERAT and the DECCAN PENINSULA.—DISTRIB. Tropical Asia and Africa.

A large straggling undershrub; branches terete. *Leaves* 2–4 in., base acute; petiole ⅓–½ in. *Flowering clusters* ¼ in long, fruiting ½ in. diam.

VAR. *velutina*; erect, subsimple, densely villously tomentose, leaves ½–1 in., shortly petioled orbicular. Desmochæta velutina, *Wall. Cat.* 6935; *Moq. l. c.* 332. Ærua velutina, *Moq. l. c.* 301.—Deccan Peninsula, *Wight in Herb. Wall.* Burma, at Loungee Yenong and Pagham on the Irawaddi, *Wallich.*—Moquin has described Wallich's 6935 under both *Desmochæta* and *Ærua*, quoting the same number in each case.

10. PSILOTRICHUM, *Blume.*

Herbs or shrubs. *Leaves* opposite. *Flowers* white or greenish, in solitary or panicled dense clusters or spikes. *Sepals* 5, hard; outer boat-shaped, gibbous below, ribbed. *Stamens* 5, unequal, connate below into a cup; anthers 2-celled; staminodes 0. *Ovary* oblong or subglobose; style slender, stigma capitellate or 2-fid; ovule 1, pendulous from a long basal funicle. *Utricle* globose or compressed, indehiscent. *Seed* inverse, lenticular, testa coriaceous or crustaceous; embryo annular.—Species 10, Asiatic, African and Pacific.

* *Shrubs or undershrubs with woody stocks and lower branches.*

1. **P. nudum,** *Moq. in DC. Prodr.* xiii. 2, 280; shrubby, branches

divaricate glabrous, leaves petioled ovate-lanceolate acute glabrous, spikes sessile many-fld., bracts lanceolate, sepals ¼ in. deeply grooved hairy. Achyranthes nuda, *Herb. Heyne in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 507; *Wall. Cat.* 6926. A. montana, *Klein mss.* A. polygonoides, var. *Herb. Heyne.*

DECCAN PENINSULA; *Heyne, G. Thomson.*

Branches many from the woody stock, 2–3 ft., terete, woody, tips only hairy. *Leaves* 1½–3 in., glabrous, narrowed into a short petiole, nerves faint. *Spikes* ⅓–1½ in., strict, hairy, 6- or many-fld.; bracts persistent, acuminate. *Sepals* pubescent, deeply grooved, rigid, acuminate.—Very near a S.E. Tropical African species.

2. **P. scleranthum,** *Thwaites Enum.* 248; an undershrub, branches divaricate tomentose, leaves subsessile ovate-lanceolate acute scaberulous, spikes terminal peduncled 3-nate, bracts broadly ovate, sepals ¼ in. obscurely grooved hairy.

CEYLON; at Anooradhapoora, *Gardner.*

Habit of *P. nudum,* but branches tomentose, leaves scaberulous on both surfaces and inflorescence branched. The 3 terminal spikes are sessile on the top of a tomentose peduncle ½ in. long, are dense-fld., oblong, the middle one ½ in. erect, the lateral horizontal and shorter. *Sepals* pubescent, pungent.—Described from a single specimen.

3. **P. calceolatum,** *Moq. in DC. Prodr.* xiii. 2, 280; a small undershrub, branches divaricate pubescent or glabrate, leaves subsessile ovate or elliptic acute glabrous sparsely hairy, spikes axillary sessile or peduncled short few-fld., bracts cymbiform acute, sepals ⅙ in. oblong acute ribbed villous. P. nudum, *Wight Ic.* t. 1775. Achyranthes calceolata, *Herb. Russel in Wall. Cat.* 6927. A. glauca, *Herb. Heyne.* Ptilotus ovatus, *Moq. l. c.* 281.

DECCAN PENINSULA, *Heyne,* in jungles on the hills, *Wight.* CEYLON; in the hotter parts of the island, *Moon,* &c.

Habit of *P. nudum* (sometimes subscandent, *Wight*), but much smaller and more slender. *Leaves* ½–1½ in. *Spikes* 4–6-fld., sometimes peduncled by being terminal on a leafless axillary branch, at others the peduncle itself lengthens.—A Natal species hardly differs.

VAR. *tomentosa*; leaves pubescent above tomentose beneath.—Scraps of this are on sheets of 6926 A and 6927 B in *Herb. Wall.*

** *Annuals.*

4. **P. trichotomum,** *Blume Bijd.* 545; annual, slender, glabrous, branches erect, leaves petioled elliptic- or elliptic-lanceolate acute, spikes terminal and in the forks sessile or peduncled, bracts lanceolate, sepals $\frac{1}{12}$ in. deeply grooved acuminate glabrous. *Moq. in DC. Prodr.* xiii. 2, 280. Achyranthes? carnosa, *Wall. Cat.* 6931. Leiospermum ferrugineum, *Wight Ic.* t. 721.

ASSAM, *Griffith.* SILHET, at Terrya Ghat, *H. f. & T.* PEGU, *M'Clelland.*—DISTRIB. Java, Borneo, Philippines.

Flaccid, 12–18 in. high, decumbent. *Leaves* 1–2½ in., rarely obovate, thin, narrowed into a very short petiole. *Spikes* ⅓–⅔ in., green, terminal, sometimes 3-nate; flowers crowded. *Sepals* narrow.

5. **P. ferrugineum,** *Moq. in DC. Prodr.* xiii. 2, 279; annual, glabrous, branches prostrate, leaves linear- or obovate-oblong, spikes terminal and in the forks sessile or peduncled, bracts subulate-lanceolate, sepals $\frac{1}{12}$ in. deeply grooved glabrous, outer obtuse. Achyranthes ferruginea, *Roxb. Fl. Ind.* i.

675, and *Ed. Carey & Wall.*, ii. 502. Leiospermum ferrugineum, *Wall. Cat.* 6923.

BENGAL; a weed in the gardens and cultivated lands of Calcutta, *Roxburgh*.

Wallich's specimen forms an excessively branched prostrate mass 9 in. diam., with divaricate branches and linear-oblong leaves 1–1½ in. long. *Spikes* ½ in. long, dense-fld., yellow when dry.—Roxburgh's description applies more nearly to *P. trichotomum* in the form of the leaves, and Wight's figure, copied from Roxburgh's drawing, and which shows acuminate sepals, is, I think, certainly taken from the latter plant. There are no indications in Wallich's specimens gathered in the Calcutta Garden of the rust-coloured stem, reddish leaves and dull red flowers described by Roxburgh.

11. PSILOSTACHYS, *Hochst.*

Slender dichotomous herbs. *Leaves* opposite. *Flowers* minute, spicate at the tips of the filiform branches of a lax panicle. *Sepals* 5, 2–3 outer convex, strongly 3-nerved, inner narrower. *Stamens* 5, free; anthers 2-celled; staminodes 0. *Ovary* rounded or ovoid, compressed; style slender? stigma capitellate. *Utricle* indehiscent. *Seed* inverse, testa coriaceous; embryo hooked, cotyledons slender.—Species 3, Indian, Arabian and African.

P. sericea, *Hook. f. in Gen. Plant.* iii. 32; stem erect, villous with long hairs, leaves orbicular-ovate acute densely villous above silky beneath, peduncles very long axillary filiform, pedicels capillary, spikes 4–6 fld. Achyranthes sericea, *Koen. in Roxb. Fl. Ind.* iii. 675, and *Ed. Carey & Wall.* ii. 502; *Moq. in DC. Prodr.* xiii. 2, 318; *Wight Ic.* 726; *Wall. Cat.* 6930. Psilotrichum sericeum, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 216.

GOOZERAT; sandy hills on the coast of Kattiawar, *Dalzell* (and *Koenig ?*).

Annual? *Stem* stout, hard, terete; hairs patent, ¼ in. long, flexuous, terminating in a lax panicle of erecto-patent opposite branches 2 in. long, which divide at the tip into capillary pedicels bearing the spikes. *Leaves* 1 in., thick, base rounded or cordate; petiole very short. *Spikes* ¼–½ in., rachis capillary zigzag; flowers $\frac{1}{10}$ in. long. *Sepals* ovate-lanceolate; outer pungent, deeply ribbed, silky.—A very beautiful plant; it is not known where Koenig procured it, if indeed he did himself procure it. The specimen in the Wallichian Herbarium is marked "Herb. Koenig."

12. NOTHOSÆRUA, *Wight.*

An annual with opposite spreading branches. *Leaves* opposite. *Flowers* most minute, woolly, in axillary solitary or clustered spikelets. *Sepals* 3–5, hyaline, obtuse, 1-nerved. *Stamens* 1–2, free; anthers 2-celled; staminodes 0. *Ovary* oblong, compressed; stigma subsessile, capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong, compressed, indehiscent. *Seed* inverse, lenticular, testa crustaceous; embryo hooked, cotyledons linear.

N. brachiata, *Wight Ic.* vi. 1. Pseudanthus brachiatus, *Wight l. c.* t. 1776, *excl. analyses*, and v. 3, t. 1776 *bis*, B. Ærua brachiata, *Mart. Beitr. Amarant.* 83, n. 3; *Moq. in DC. Prodr.* xiii. 2, 304 (*incorrect as to staminodes*); *Dalz. & Gibs. Bomb. Fl.* 217. Æ. chenopodiifolia, *Bojer Hort. Maurit.* 268. Achyranthes brachiata, *Linn. Mant.* 50; *Roth Nov. Sp.* 169. Illecebrum brachiatum, *Linn. Mant.* 23. Amarantus minutus, *Leschen. mss.*

UPPER GANGETIC VALLEY and the PANJAB, from Moradabad north-eastward.

SCINDE and the CONCAN, *Stocks*, &c. MAISOR and the CARNATIC. BURMA, *Wallich.* CEYLON, common.—DISTRIB. Mauritius, E. and W. tropical Africa.

Erect, 1–2 ft., branched from the base; branches puberulous, spreading. *Leaves* 1–2 in., ovate elliptic or subovate, obtuse or subacute, membranous, green; petiole 0–¼ in. *Spikes* very numerous, sessile, ¼–½ in. long, cylindric, white, dense-fld.; bracts broadly ovate, hyaline, persistent. *Sepals* $\frac{1}{30}$ in. long, silkily villous.—One of the smallest flowered plants provided with a regular perianth. Moquin has probably confounded this with the very similar *Ærua lanata* (as did Wight), to which the latter part of his description applies.

13. **ÆRUA,** *Forsk.*

Woolly herbs or undershrubs. *Leaves* alternate or opposite. *Flowers* small or minute, in solitary or panicled spikes, often polygamous. *Sepals* 4–5, short, membranous, all or the inner only woolly. *Stamens* 4–5, connate below with interposed linear staminodes into a cup; anthers 2-celled. *Ovary* ovoid or subglobose; style long or short, stigma capitellate or 2-fid; ovule 1, pendulous from a long basal funicle. *Utricle* indehiscent, or the coriaceous crown circumsciss. *Seed* inverse, testa coriaceous; embryo annular.—Species 10, tropical Asiatic and African.

* *Spikes axillary and in terminal panicles. Leaves opposite or alternate.*

1. **Æ. javanica,** *Juss. in Ann. Mus.* xi. 131; hoary-tomentose, shrubby below, leaves from linear to oblanceolate or oblong acute obtuse or retuse, spikes elongate densely woolly not glistening, style elongate, stigmas long. *Wall. Cat.* 6908; *Wight Ic.* t. 876; *Moq. in DC. Prodr.* xiii. 2, 299; *Dalz. & Gibs. Bomb. Fl.* 216; *Boiss. Fl. Orient.* iv. 992. Æ. Wallichii, *Moq. l. c.* 300. Æ. tomentosa, *Forsk. Fl. Æg. Arab.* 122; *Lamk. Dict.* i. 46. Æ. ægyptiaca, *Gmel. Syst.* 1026. Æ. Bovii, *Edgew. in Journ. Linn. Soc.* vi. 206. Æ. incana, *Mart. in Nov. Act. Acad. Nat. Cur.* xii. (1826), 291. Achyranthes alopecuroides, *Lamk. l. c.* 548. A. javanica, *Pers. Syn.* i. 259. A. incana, *Roxb. Fl. Ind.* i. 671, and *Ed. Carey & Wall.* ii. 495. Illecebrum javanicum, *Ait. Hort. Kew*, 289. Iresine javanica & persica, *Burm. Fl. Ind.* 212 (by error 312), t. 65. Celosia lanata, *Linn. Sp. Pl.* 298.

From the OUDH TERAI, *Wallich*, to the PANJAB, *Royle*, &c. SCINDE, *Stocks.* CENTRAL INDIA, *Clarke.* The DECCAN from the CONCAN southward. BURMA, *Wallich.* CEYLON; N. of the island, *Gardner.*—DISTRIB. Westward to Arabia, E. and W. tropical Africa, and the Cape Verde Islands. Java?

Diœcious. *Stem* terete, 2–3 ft., branched, as thick as a goose-quill. *Leaves* alternate, 1–4 in., flat or with recurved margins, sessile or narrowed into a petiole; nerves distinct. *Spikes* often in large panicles, sessile, erect or nodding, 1–6 in. long. *Flowers* $\frac{1}{18}$ in. long, enveloped in long wool, males very rare.—Edgeworth (Fl. Mall. l. c.) insists that the narrow-leaved form is a distinct species, and is odorous, which *Æ. javanica* (which grows with it) is not. Boissier makes a variety of it; local botanists should see to this.

2. **Æ. scandens,** *Wall. Cat.* 6911, *excl. M*; a climbing undershrub, branches hoary-tomentose, leaves ovate elliptic oblong or lanceolate obtuse or acute glabrous or hoary, spikes globose ovoid or shortly cylindric woolly shining, sepals lanceolate acuminate, stigmas very short. *Moq. in DC. Prodr.* xiii. 2, 302; *Wight Ic.* t. 724 (utricle and seed wrong); *Dalz. & Gibs. Bomb. Fl.* 217. Achyranthes scandens, *Roxb. Fl. Ind.* i. 676, and *Ed. Carey & Wall.*, ii. 503.

Plains of BENGAL, and from ASSAM to the PANJAB; ascending the HIMALAYA to 5000 ft. from Kumaon to Bhotan. CENTRAL INDIA and BEHAR, and summit of Parusnath. CONCAN, *Stocks.* PEGU, *M'Clelland.* BURMA, *Wallich,* &c.—DISTRIB. China, Malay Islands, Philippines, E. and W. tropical Africa.

Stem woody below; branches straggling, several feet long. *Leaves* opposite and alternate, soft, green, 1–4 in. long, sometimes almost rounded; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* sessile, rarely peduncled, $\frac{1}{4}$–1 in. *Sepals* $\frac{1}{10}$ in. long, lanceolate.—Wight has erroneously figured the utricle as circumsciss and seed horizontal. I doubt if *Æ. sanguinolenta,* Blume, and *Æ. timorensis,* Moq., differ from this.

VAR.? *subglobosa*; branches glabrous, spikes large subovoid or globose, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., on slender peduncles.—Mergui, *Griffith* (*in Herb. Wight*).—This resembles very indifferent specimens of *Æ. scandens* (*Æ. velutina,* Moq.) from the Philippines (Cuming, No. 1635), but the spikes are larger.

3. **Æ. glabrata,** *Hook. f.*; minutely hairy, leaves elliptic-ovate subacute, spikes small cylindric panicled or fascicled towards the ends of the branches glistening, bracts ovate equalling the very minute flowers, sepals broadly oblong-ovate obtuse or apiculate sparingly hairy.

BURMA or MALAY PENINSULA, *Griffith.*

Habit of *Æ. scandens,* but the flowers are very minute, about $\frac{1}{18}$ in. long, with very broad short and sparsely hairy bracts and sepals, the latter with usually a very broad green midrib. Hance's *A. scandens,* var. from Canton, may be the same, but the spikes are too young for comparison.

** *Spikes all axillary sessile. Leaves alternate.*

4. **Æ. lanata,** *Juss. in Ann. Mus.* xi. 131; erect or prostrate, branched from the base, hoary tomentose, leaves small petioled elliptic orbicular-obovate or orbicular obtuse or acute, spikes small very numerous oblong or subcylindric densely woolly not glistening. *Moq. in DC. Prodr.* xiii. 2, 303; *Wall. Cat.* 6909; *Wight Ic.* t. 723; *Grah. Cat. Bomb. Pl.* 168; *Dalz. & Gibs. Bomb. Fl.* 217; *Boiss. Fl. Orient.* iv. 993. Æ. floribunda, *Wight Ic.* t. 1776, *the analysis only,* and vol. v. t. 1776 *bis,* f. A. Achyranthes villosa, *Forsk. Fl. Æg. Arab.* 48. A. lanata, *Linn. Sp. Pl.* 296; *Roxb. Fl. Ind.* i. 676, and *Ed. Carey & Wall.* ii. 503. Illecebrum lanatum, *Linn. Mant.* 344.—*Rheede Hort. Mal.* x. t. 29; *Burm. Fl. Zeyl.* t. 60, f. 1.

Plains of BENGAL from Dacca and Behar westward to the Indus. The CONCAN, CENTRAL INDIA, and throughout the DECCAN. CEYLON abundant.—DISTRIB. Westward to Arabia and tropical and S. Africa, Java, Philippines.

Branches many, 6–10 in., from a woody stock, simple or divided, woolly. *Leaves* $\frac{1}{2}$–1 in., woolly or glabrate. *Spikes* $\frac{1}{4}$–$\frac{1}{2}$ in., sometimes excessively crowded and forming subglobose clusters. *Sepals* obtuse.—Wight's t. 723 is probably *A. scandens.*

5. **Æ. Wightii,** *Hook. f.*; branches short woody and leaves beneath densely woolly, leaves small broadly ovate or elliptic obtuse thick, clusters all axillary sessile shortly oblong or globose densely woolly not glistening, outer sepals linear-oblong aristate, inner obtuse.

TRAVANCORE; at Courtallum, *Wight.*

A low-growing bushy plant, 6–12 in. high, with many stiff branches as thick as a crow-quill, from a stout woody tap-root. *Leaves* 1 in. long, narrowed into a short petiole. *Clusters* $\frac{1}{4}$–$\frac{1}{3}$ in. long, with the acicular tips of the bracts and outer sepals a little longer than the wool; flowers $\frac{1}{12}$ in. long.

*** *Spikes peduncled. Sepals 4. Leaves filiform in opposite fascicles.*

6. **Æ. Monsonia,** *Mart. Beitr. Amarant.* 83; stem hoary-tomentose

or woolly trichotomously branched angled and grooved, spikes cylindric on opposite strict horizontal peduncles or branches glistening, sepals lanceolate acuminate, utricle oblong, top circumsciss. *Moq. in DC. Prodr.* xiii. 2, 305; *Wall. Cat.* 6912; *Dalz. & Gibs. Bomb. Fl.* 217. Æ.? setacea, *Mart. l. c.*; *Moq. l. c.* Achyranthes Monsonia, *Pers. Syn.* i. 258; *Roxb. Fl. Ind.* i. 673, and *Ed. Carey & Wall.* ii. 499; *Wight Ic.* t. 725. A. setacea, *Roth Nov. Sp.* 168. A. pungens, *Lamk. Dict.* i. 546. Celosia Monsonia, *Retz. Obs.* ii. 13. Illecebrum Monsonium, *Linn. f. Suppl.* 161.

BENGAL, *Roxburgh.* CENTRAL INDIA; Sumbulpore, *Griffith.* BURMA; at Yenongheum, *Wallich.* The CONCAN and DECCAN PENINSULA; abundant in dry places.

Branches many, prostrate or ascending from a very long flexuous woody tap-root, 1–3 ft., with numerous woolly nodes, and opposite or 3-nately whorled fascicles of leaves and peduncled spikes or branches. *Leaves* ½–1 in., exceedingly slender, woolly. *Spikes* as long, with densely imbricating rose-coloured flowers, solitary or subpanicled; bracts many, lanceolate. *Sepals* 4, subulate-lanceolate, acuminate, $\frac{1}{12}$ in. long. *Utricle* enclosed in the large staminal cup; stigma capitate, subsessile.

DOUBTFUL SPECIES.

Æ. RADICANS, *Mart. Beitr. Amarant.* 83 (*Moq. in DC. Prodr.* xiii. 2, 302. Achyranthes radicans, *Heyne in Roth Nov. Sp.* 170), is undetermined.

Æ. ? NERVOSA, *Mart. l. c.* (*Moq. l. c.* 306, Achyranthes nervosa, *Roth l. c.*), and A. PUBESCENS, *Mart. l. c.* (*Moq. l. c.*, Achyranthes pubescens, *Roth l. c.* 171; Illecebrum pubescens, *Willd. Enum. Hort. Berol.* i. 271) are both indeterminable.

14. **STILBANTHUS,** *Hook. f.*

A climbing tree with pendulous branches. *Leaves* opposite. *Flowers* large, white, shining, in panicled pubescent spikes. *Sepals* 5, hard and scarious, narrowly ovate-lanceolate, acute, tips bearded at the back, outer broader. *Stamens* 5, filaments shortly connate below, with long ligulate lacerate staminodes; anthers 2-celled. *Ovary* oblong, compressed, tip penicillate; style filiform, stigma capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong, top villous, indehiscent. *Seed* inverse, testa coriaceous; embryo annular.

S. scandens, *Hook. f. in Hook. Ic. Pl.* t. 1286. Ærua scandens, *Gamble, Trees, &c., of Darjeeling, not of Wallich.*

EASTERN BENGAL, *Herb. Griffith.* SIKKIM HIMALAYA, alt. 5–7000 ft., *J. D. H.*

Trunk as thick as the thigh, "reaching the tops of tall trees, which it covers with masses of handsome flowers and soft whitish leaves." *Gamble.* *Branches* soft, herbaceous, obtusely 4-angled, terminal silkily hairy, bases of internodes and of petioles contracting when dry. *Leaves* 4–6 by 2–3 in., elliptic, acuminate at both ends, finely pointed, sparsely pubescent above, villous or glabrate beneath; petiole ½–1 in., villous. *Spikes* 1–3 in. long, in terminal spreading trichotomously branched panicles, sessile or peduncled, cylindric; peduncles and pedicels villous. *Flowers* spreading, ½ in. long, white, shining; bracts short, ovate, apiculate; bracteoles rather longer. *Sepals* striate. *Filaments* very slender, hairy, shorter than the filiform staminodes; anthers oblong.—The most gigantic Asiatic plant of the Order.

15. **ACHYRANTHES,** *Linn.*

Herbs. *Leaves* opposite. *Flowers* in slender simple or panicled spikes, soon deflexed; bracts and bracteoles spinescent. *Sepals* 4–5, subulate-lanceolate, aristate, shining, at length hardened and strongly ribbed. *Stamens* 2–5, filaments connate at the base with as many square staminodes, each of which is toothed or has a toothed scale at its back; anthers 2-celled.

Ovary oblong, subcompressed; style filiform, stigma capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong or ovoid, indehiscent, top areolate or rounded. *Seed* inverse, oblong, testa coriaceous; embryo annular.—Species 12, all tropical or subtropical.

* *Outer sepal longest.*

1. **A. aquatica,** *Br. Prodr.* 417; tall, stout, finely pubescent, leaves elliptic-lanceolate acuminate, spikes elongate, rachis villous or pubescent, flowers $\frac{1}{3}$ in. long, bracts small scarious, bracteoles orbicular, sepals rigid glabrous, outer longer pungent. *Roxb. Fl. Ind.* i. 673, and *Ed. Carey & Wall.* ii. 497. A. natans, *Ham. in Wall. Cat.* A. trichotoma, *Perrott. Herb. Seneg.* n. 180. Centrostachys aquatica, *Wall. Cat.* 6932; *Moq. in DC. Prodr.* xiii. 2, 321; *Endl. Iconog.* t. 20. Celosia spinescens, *Herb. Russel.*

NEPAL TERAI, *Wallich.* ASSAM and SILHET, *Griffith, De Silva.* TENASSERIM; at Moulmein, *Wallich.* CIRCARS and COROMANDEL, *Roxburgh.*—DISTRIB. Tropical Africa.

Stem 2–4 ft., as thick as the thumb below, straggling in the water and rooting along the banks of rivers, &c., branched. *Leaves* 3–6 in., narrowed into a petiole, $\frac{1}{2}$–1 in. *Spikes* 3–18 in.; bracts small, membranous, concave, long-acuminate from an ovate base; bracteoles membranous, embracing the thickened perianth base. *Perianth* shining, very variable in size and thickness, base much thickened.

** *Sepals subequal.*

2. **A. aspera,** *Linn. Sp. Pl.* 204; leaves orbicular obovate or elliptic, spikes rigid, bracteoles ovate half as long as their spine or longer, stamens 5, staminodes fimbriate. *Moq. in DC. Prodr.* xiii. 2, 314; *Boiss. Fl. Orient.* iv. 993; *Roxb. Fl. Ind.* i. 672, and *Ed. Carey & Wall.* ii. 496; *Dalz. & Gibs. Bomb. Fl.* 218; *Wight Ic.* 1780; *Wall. Cat.* 6924, *excl. H.*

Throughout INDIA and CEYLON; an abundant weed in dry places.—DISTRIB. Tropical Asia, Africa, Australia and America.

Stem 1–3 ft., simple or branched. *Leaves* 1–5 in., extremely variable, generally thick, pubescent tomentose or velvety, rarely glabrate; petiole short. *Spikes* usually with a robust rachis that rapidly lengthens, sometimes to a foot long. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in., longer than the bracteoles. *Staminodes* fimbriate from the margin or from an appendage below the margin behind.

VAR. *rubro-fusca*; leaves elliptic-ovate acute brown when dry. A. rubro-fusca, *Wight Ic.* t. 1778 (A. viridis).—Nilghiris, *Wight.* Ceylon.

VAR. *porphyristachya*; much larger, 4–6 ft., diffusely branched, leaves 3–10 in. broadly elliptic acuminate glabrous or pubescent, membranous, spikes with a more slender rachis. A. porphyristachya, *Wall. Cat.* 6925; *Moq. l. c.* 316. ? A. argentea, *Thwaites Enum.* 249.—In moister climates than *A. aspera* proper. Sikkim Himalaya, alt. 2–5000 ft. Chittagong, *J. D. H. & T. T.* Nilghiris, *Wight,* &c. Ava, *Wallich.*

VAR. *argentea*; leaves silverily silky beneath. A. argentea, *Thwaites Enum.* 249; *Lamk. Dict.* i. 545.—Thwaites mentions this as found at Caltura by Moon, but I have seen no specimens; he includes under it *A. porphyristachya* and *rubro-fusca*, which makes me doubt his being Lamarck's plant, which is an European, Arabian and African one.

3. **A. bidentata,** *Blume Bijd.* 545; branches slender rambling, leaves from elliptic to linear lanceolate acuminate glabrous or pubescent membranous, spikes very slender, bracteoles usually reduced to a spine minutely 2-auricled at the base, stamens 5, staminodes toothed. *Moq. in DC. Prodr.*

xiii. 2, 312; *Wight Ic.* t. 1779. A. Wightiana and A. lanceolata, *Wall. Cat.* 6928, 6929. A. aspera, *Wall. Cat.* 6924 H.

TEMPERATE and SUBTROPICAL HIMALAYA; from Kishtwar, *Clarke*, to Sikkim, alt. 4–6000 ft., *J. D. H.* KHASIA MTS., alt. 4–6000 ft. BEHAR; top of Parusnath, *Thomson*. The CONCAN, NILGHIRI and TRAVANCORE MTS., *Wight*, &c. CEYLON, abundant.—DISTRIB. China, Java, Japan.

Habit of *A. aspera*, var. *porphyristachya*, and leaves often as large, but the bracteoles are reduced to spines with scarcely a blade, or with a minute auricle on each side of the base, and the staminodes are not fringed. It may prove a form of that plant. Some Nynee-tal specimens, collected by Col. Davidson, almost with the blade of the bracteoles half as long as the spine, unite them in this respect. The very narrow-leaved forms (*Wallichiana* and *lanceolata*) occur in the Khasia and Himalaya along with the more typical, as they do in the Deccan hills.

4. **A. diandra,** *Roxb. Fl. Ind.* i. 504; stem slender diffusely branched, leaves linear-lanceolate or linear glabrous or nearly so, spikes very slender pubescent, bracteoles of a spine as long as the sepals 2-auricled at the base, stamens 2, staminodes fimbriate. Centrostachys diandra, *Wall. in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 504; *Moq. in DC. Prodr.* xiii. 2, 322; *Wight Ic.* t. 722.

CEYLON; common in the warmer districts, *Thwaites*.

Annual or biennial, 12–18 in. high, very much more slender than any other species. *Leaves* 2–4 by $\frac{1}{4}$–$\frac{2}{3}$ in., membranous, green. *Spikes* 3–6 in.; flowers distant, $\frac{1}{6}$ in. long, very slender.

UNDETERMINABLE SPECIES.

A. BENGALENSIS, *Lamk. Dict.* i. 459; *Moq. in DC. Prodr.* xiii. 2, 317. Paronychia bengalensis, *Roem. & Schultes Syst.* v. 521, *not of Juss.* Illecebrum bengalense, *Linn. Mant.* 213.

A. SARMENTOSA, *Vahl Symb.* ii. 44; *Moq. l. c.* 318.

16. ALTERNANTHERA, *Forsk.*

Herbs, usually prostrate. *Leaves* opposite. *Flowers* small, white, capitate; heads axillary, often clustered. *Sepals* unequal, anterior and 2 posterior flattened; 2 lateral innermost, concave. *Stamens* 2–5, filaments short, connate into a short cup with or without interposed staminodes; anthers 1-celled. *Ovary* orbicular or ovoid; stigma subsessile, capitellate (rarely 2-fid); ovule 1, pendulous from a long basal funicle. *Utricle* compressed, ovoid orbicular or obcordate, margins often winged or thickened. *Seed* inverse, lenticular, testa coriaceous; embryo annular, cotyledons narrow.—Species about 16, tropical and subtropical.

1. **A. sessilis,** *Br. Prodr.* 417; branches many from the root prostrate or ascending, leaves linear oblong lanceolate or elliptic obtuse or subacute, sepals glabrous rigid acute, anthers 2–3, utricle obcordate. *Moq. in DC. Prodr.* xiii. 2, 357. *Boiss. Fl. Orient.* iv. 996; *Dalz. & Gibs. Bomb. Fl.* 220; *Wight Ic.* t. 727; *Wall. Cat.* 6921. A denticulata, *Wall. Cat.* 6922. A. prostrata, *Don Prodr.* 86; *Moq. l. c.* 360, *for the most part.* Achyranthes triandra, *Roxb. Fl. Ind.* i. 678, and *Ed. Carey & Wall.* ii. 505. Gomphrena sessilis, *Linn. Sp. Pl.* 225.—*Rheede Hort. Mal.* x. t. 11.

Throughout hotter INDIA and CEYLON in damp places, ascending the HIMALAYA to 4000 ft.—DISTRIB. All warm countries.

Branches 3–18 in. long, glabrous, the ultimate with 2 lines of hairs; nodes often villous. *Leaves* 1–3 in., in watery places even longer (4 by 1 in.), rather fleshy, sometimes obscurely denticulate. *Clusters* $\frac{1}{4}$–$\frac{1}{2}$ in. long, white, hardly glistening; flowers $\frac{1}{18}$–$\frac{1}{12}$ in. long. *Utricle* usually broader than the perianth, very broadly

obcordate, rarely exceeding the sepals, wings often corky.—Wallich's *A. sessilis* & *denticulata* are all *sessilis* except Sheet 6921 F, of which all but the left-hand specimens are as *nodiflora*.

2. **A nodiflora,** *Br. Prodr.* 417; branches prostrate or ascending, leaves linear linear-oblong or lanceolate obtuse or subacute, sepals glabrous hyaline finely acuminate, anthers 3, utricle much shorter than the sepals obcordate. *Moq. in DC. Prodr.* xiii. 2, 356; *Benth. Fl. Austral.* v. 249. A. denticulata, *Br. l. c.*

SILHET, *Wallich.* TENASSERIM, at Mergui, *Griffith.*—DISTRIB. Tropical Asia, Australia, Polynesia and Africa, Japan.

Often very difficult to distinguish from *A. sessilis,* heads often in great clusters (not seen in Indian specimen), sepals thinner, much more pointed, and utricle smaller and not so broad.—This would seem to be the most abundant African and Australian plant, though scarce in India proper. Bentham's *A. denticulata* (Fl. Austral. v. 249) is, I think, *A. sessilis*; he mentions the difficulty of distinguishing it from *nodiflora,* but says nothing about *sessilis*. Boissier (Fl. Orient. iv. 996) considers *nodiflora* and *denticulata* to be one and the same, and different from *sessilis*.

17. GOMPHRENA, *Linn.*

Herbs, hirsute or villous, with usually thickened nodes. *Leaves* opposite. *Flowers* capitate or spicate, white or coloured. *Sepals* 5, lanceolate, acuminate. *Stamens* 5, filaments linear united below into a long tube cleft at the top, with a one-celled anther in each cleft, usually without interposed staminodes. *Ovary* subglobose or turbinate; style short or long, stigmas 2; ovule 1, pendulous from a long basal funicle. *Utricle* compressed, indehiscent. *Seed* inverse, lenticular, testa coriaceous; embryo annular.—Species 70, S. American and Australian, of which one is also Asiatic.

Gomphrena hispida, Linn. Sp. Pl. Ed. 2, i. 326 (Moq. in DC. Prodr. xiii. 1, 411), is founded on a plate in Hortus Malabaricus (ix. t. 72) which is quite unworthy of notice. It represents a plant with the habit of *G. globosa,* but with serrated leaves. *G. angustifolia,* Vahl Symb. iii. 45 (Moq. l. c. 417), stated to be a native of the East Indies (*Koenig*) and Guinea (*Schumacher*), is probably some garden escape of which nothing is known.

G. globosa, *Linn. Sp. Pl.* 224; erect, branched, hairy or subsilky, leaves shortly petioled elliptic or obovate-oblong acute or obtuse, heads large globose with 2 leafy bracts, bracteoles pinkish purple, lateral with a cristate dorsal wing, sepals densely woolly. *Moq. in DC. Prodr.* xiii. 2, 409; *Roxb. Fl. Ind.* ii. 63; *Grah. Cat. Bomb. Pl.* 169; *Dalz. & Gibs. Bomb. Fl., Suppl.* 72; *Wight Ic.* 1784; *Bot. Mag.* t. 2815.—*Rheede Hort. Mal.* x. t. 37.

An escape from gardens in various parts of INDIA; cultivated in all countries—probably originating in America.

A tall dichotomously branched annual, branches stout obscurely 4-angled. *Leaves* 2–4 in., scaberulous, pale green; petiole 0–1 in. *Heads* 1–1½ in. diam., peduncled, terminating the branches; bracts under the head ½–1 in.; flowers densely imbricate; branches ½–¾ in., scarious, lanceolate, much longer than the perianth. *Sepals* lanceolate, densely woolly, shorter than the staminal tube.

ADDITIONS AND CORRECTIONS, VOL. IV.

P. 7. *Utleria salicifolia*, Beddome; add *Hook. f. Ic. Pl.* t. 1432.

P. 8. *Atherolepis Wallichii*, Hook. f.; add *Hook. f. Ic. Pl.* t. 1433.

P. 33. At end of *Gymnema* add:—

G. ? MACRANTHUM, *Hook. f. Ic. Pl.* t. 1436; stem robust, leaves elliptic-ovate acuminate glabrous, cymes corymbose or subumbellate puberulous, peduncles stout, flowers large ebracteolate, sepals elliptic-oblong obtuse, corolla-tube equalling the sepals, lobes pubescent within, coronal processes of the corolla small villous inserted at the mouth of the corolla alternating with its lobes.

SIKKIM HIMALAYAS, *King.*

Stem terete. *Leaves* 3–5 in., distant, base rounded or cordate, nerves 3–4 pair; petiole 1½–2 in. *Peduncles* 2–3 in., stout, often decurved; pedicels ¼–⅓ in. *Sepals* ¼ in. *Corolla* ½ in. diam., thick, tube glabrous within. *Column* large, stoutly stipitate; scales of the staminal corona adnate to the backs of the anthers, obtuse; anther-tips large, ovate-oblong, obtuse, membranous; pollen-masses shortly stipitate, oblong-reniform, corpuscle elongate erect. *Stigma* thick, obtuse, exserted.—A doubtful *Gymnema*, larger and more robust than any other Indian species, with singularly stout peduncles. The corolline coronal scales are almost reduced to tufts of hairs; the staminal scales resemble those of a *Marsdema.*

P. 41. To section ** of *Tylophora* add:—

T. MICROSTACHYS, *Hook. f. Ic. Pl.* t. 1450; quite glabrous, leaves shortly petioled linear-lanceolate acuminate, cymes reduced to very short axillary sessile racemes, bracts minute setaceous, flowers minute shortly pedicelled, sepals setaceous equalling the corolla, staminal column subovoid, coronal processes obscure, follicles elongate poignard-shaped, tips elongate.

TENASSERIM; Moulmein, *Falconer in Herb. Calcutta.*

Stem very slender, twining. *Leaves* 2–3 by ¼–½ in., subcoriaceous, midrib stout, nerves obscure. *Racemes* ¼–½ in., oblong. *Flowers* $\frac{1}{12}$ in. diam. *Corolla-lobes* ovate. *Column* rather large, tips of anthers rounded. *Follicles* 2–4 in., thinly coriaceous. *Seeds* ⅓ in. long, oblong-ovoid, concavo-convex, brown, hairs ½ in. long.

P. 97. *Exacum zeylanicum*, Roxb.; add *Wawra It. Pr. S. Cob. Bot.* t. 112.

P. 112. *Gentiana argentea*, Royle; add *Wawra l. c.* t. 113.

P. 114. To *Gentiana* add:—

G. (Chondrophyllum) LODERI, *Hook. f. Ic. Pl.* t. 1440 A; quite glabrous, perennial, branches prostrate leafy, leaves subsessile broadly elliptic obtuse 3-nerved, flowers terminal solitary sessile, calyx campanulate, lobes equalling the tube spathulate spreading and recurved, corolla tubular-campanulate blue, lobes 5 rounded ovate, scales erect fimbriate, style slender.

KASHMIR, in the Sind or Lidar Valley? *Mrs. C. Radcliffe.*

Branches 2–3 in. *Leaves* ½ in. long and broad, spreading, coriaceous, green or purplish-brown; floral hardly smaller. *Calyx* ½ in., tube purplish; lobes green, coriaceous. *Corolla-limb* 1 in. diam.—I am indebted to E. G. Loder, Esq., for a specimen of this pretty species, which is quite unlike any other Indian one. It was brought to him by his friend the finder, who is uncertain as to its exact locality in the Kashmir Valley where she gathered it.

G. (Chondrophyllum) TIBETICA, *King in Hook. f. Ic. Pl.* t. 1441; stem very stout erect, stem-leaves 6 in. lanceolate connate at the base in a cylindric sheath, uppermost sessile whorled, flowers crowded in the uppermost axils sessile, calyx tubular membranous truncate split on one side, mouth minutely 5-toothed, corolla twice as long tubular-funnel-shaped, lobes 5 triangular with a triangular fold in each sinus, capsule included, seeds ellipsoid, testa reticulated.

EASTERN HIMALAYA; Chumbi (between Sikkim and Bhotan), alt. 11,000 ft. (*Herb. Calcutta*).

Stem 18 in. high, erect, as stout as a goose-quill, simple. *Cauline leaves* 5–7 by 1–1½ in., upper broader, uppermost spreading, forming an involucre to the flowers. *Corolla* nearly 1 in. long, not spotted, rather inflated in the middle. *Ovary* sessile; style short, stigma 2-lobed. *Capsule* sessile, linear-oblong, dehiscing at the tip by recurved valves.—The calyx and broader leaves distinguish this from the following.

G. (Chondrophyllum) ROBUSTA, *King mss.*; stem ascending robust simple, cauline leaves narrowly linear connate at the base in a tubular sheath, upper crowded, flowers sessile axillary and in a dense terminal involucrate head, calyx spathaceous membranous half as long as the corolla 5-toothed, teeth short subulate, corolla tubular-campanulate, lobes short triangular with a triangular fold in each sinus.

EASTERN HIMALAYA with *T. tibetica* (Herb. Calcutta).

Stem 8–12 in. *Cauline leaves* 10–12 by 1 in., thickly coriaceous, nerves obscure near the midrib; floral shorter, broader at the base. *Calyx* split to the base, teeth setaceous, and usually longer than the others. *Corolla* 1¼–1½ in. long, not spotted, rather inflated in the middle.—This may prove a variety of *G. tibetica.*

P. 118. 35 *G. detonsa,* Fries. Asa Gray has shown that *G. serrata, Gunner,* is the earlier name for this species.

P. 123. 7 *Swertia bimaculata,* H. f. & T.—The anthers of this species become hastate in age.

P. 128. To subgenus *Euswertia* of *Swertia* add:—

S. KINGII, *Hook. f. in Ic. Pl.* t. 1442; perennial-rooted, stem tall erect robust simple, leaves opposite, radical broad elliptic subacute narrowed into a broad petiole, cauline oblong-ovate ½-amplexicaul, cymes axillary and in a terminal thyrse, sepals lanceolate quite entire, corolla 2 in. diam., petals oblong obtuse with two basal pits, margins fimbriate with long hairs, filaments with a fimbriate scale at the base behind.

SIKKIM HIMALAYA; at Na Tung (*Herb. Calcutta*).

Rootstock crowned with long fibrous remains of old leaves. *Stem* 2 ft. high, as thick as the thumb below. *Lower leaves* 3–6 by 2–4 in., many-nerved; petiole 2–3 in., semi-amplexicaul. *Flowers* greenish-white, pedicels sometimes umbellate. *Sepals* ⅜ in., one-third shorter than the corolla-lobes. *Filaments* subulate-filiform. *Ovary* narrowly oblong, stigma sessile.—Most nearly allied to S. *petiolata,* Royle.

P. 133. Order *Polemoniaceæ;* in description *for* ovules many, *read* few or many; and for capsule *septicidal,* read *loculicidal.*

P. 135. Remove 19 *Bothriospermum* from **, and place it after 16 *Rochelia* in *.

P. 167. 19 *Bothriospermum,* Bunge. In 7th line of description *after* scar *insert* basal, and erase the 4 following words. In 8th line *erase* large.

P. 168. Line 7th from top, *erase* scar, &c.

P. 176. Under *A. Griffithii,* Boiss., erase *A. echioides,* Hook. Bot. Mag. t. 4409, not of l. c.

P. 207. For *Ipomæa Stocksii,* Clarke, read *I. Clarkei,* Hook. f.

P. 220. Under *Evolvulus* insert "*E. numularius,* Linn., is getting common about Calcutta," *King.*

P. 248. 37 *Wulfenia,* for stamens 4, *read* 2.

P. 249. Under *Phtheirospermum* erase *reticulate.* Erase 50 *Emmenospermum* and the rest of the line.

P. 250. Before 4 *Linaria* insert Tribe III. *Antirrhineæ.*

P. 253. Before 7 *Scrophularia* insert Tribe IV. *Cheloneæ.*

P. 275. In description of Torenia, in 6th line *after* appendaged *insert* or not.

P. 277. 5 *T. asiatica,* var. *concolor.*—This I have since seen growing, and think it may be a different species; see Bot. Mag. t. 6797 A; it is *T. rubens,* Benth. Fl. Hongk., and a native of China.

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